

The **Iron Age**

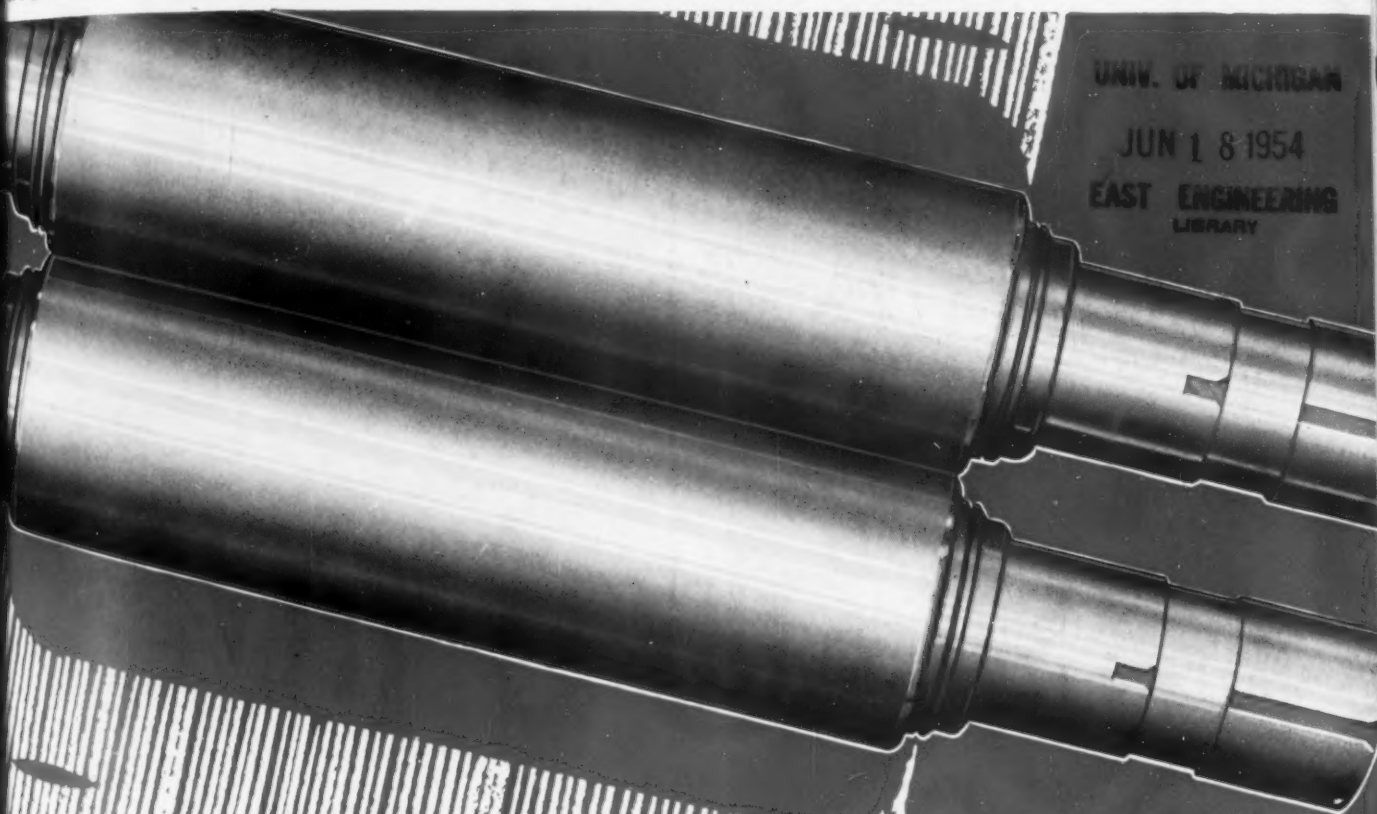
A CHILTON

PUBLICATION

NATIONAL METALWORKING WEEKLY

June 17, 1954

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UNIV. OF MICHIGAN

JUN 18 1954

EAST ENGINEERING
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Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

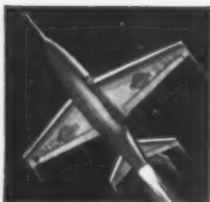
CARBON STEEL ROLLS • OHIOLOY ROLLS • OHIOLOY "K" ROLLS
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NIOLOY ROLLS • FLINTUFF ROLLS • OHIO DOUBLE - POUR ROLLS



THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • Plants at Lima and Springfield, Ohio

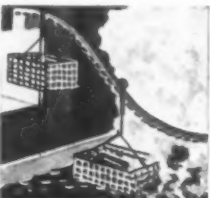
How long will this valve last?



Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.



Heating elements made of Hoskins Chromel give long life service in industrial electric furnaces, home appliances.



Hot stuff for hot jobs! Hoskins Alloy 502 is widely used by industry for many heat resistant mechanical applications.

You're looking in on a life-saving operation . . . one that's being performed on an engine valve. Not an ordinary valve for an ordinary engine. But a valve destined for long, hard service in an aircraft, tank, or heavy-duty truck engine. A valve that must be made to stand up under extremely severe operating conditions . . . high temperatures, for long periods of time, plus the destructive corrosive action of hot exhaust gases.

And what's responsible for long valve life under such gruelling conditions? Nothing less than Hoskins Alloy 717 . . . a closely controlled nickel-chromium composition developed especially for just such tough and vital service. It's highly resistant to heat . . . immune to the corrosive atmospheres created by combustion of high octane fuels. What's more, it's readily applied

by fusion to form a non-porous protective facing over the basic valve forging.

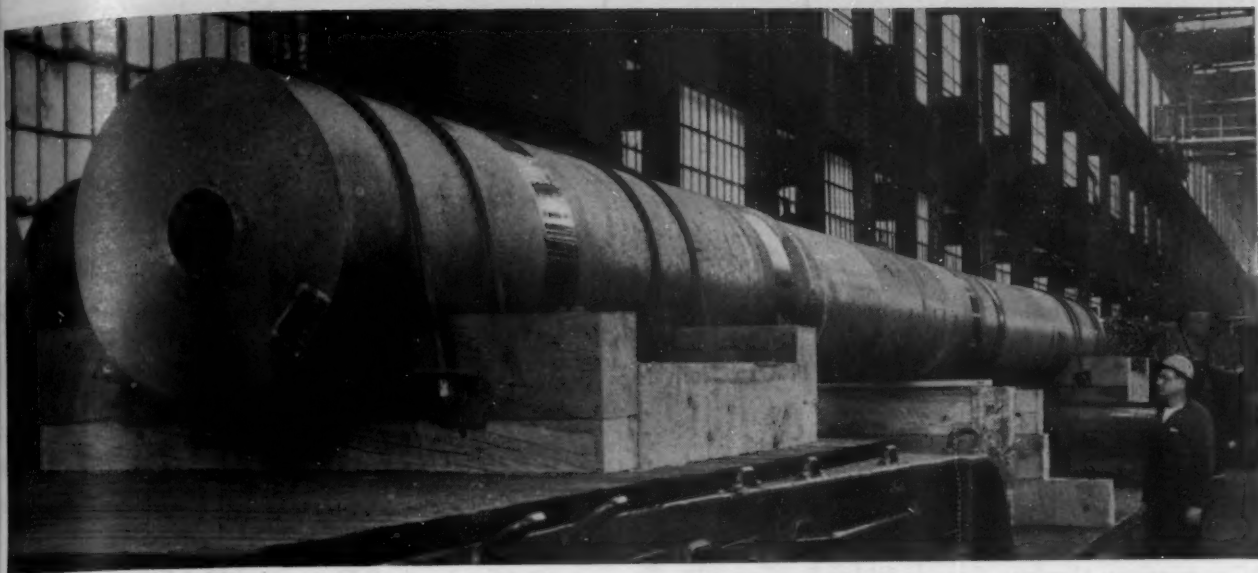
But 717 is only one of several specialized nickel-chromium alloys developed and produced by Hoskins. Among the others: Alloy 502 . . . known throughout industry for its dependability on a wide range of heat resistant mechanical applications. The Chromel-Alumel thermocouple alloys . . . unconditionally guaranteed to register true temperature—E.M.F. values within specified close limits. Spark plug electrode alloys which have become universally accepted standards of quality and durability. And, of course, there's Hoskins CHROME . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistant in countless different products.

HOSKINS

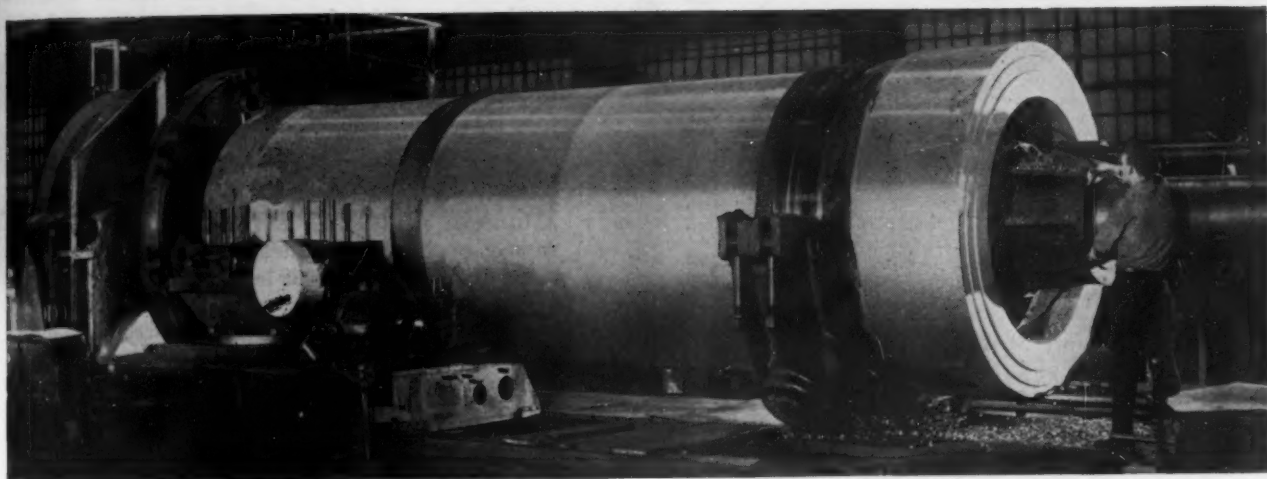
MANUFACTURING COMPANY

4445 LAWTON AVENUE, DETROIT 8, MICHIGAN





Big Parts for Two Big Presses



These forgings couldn't be hidden under anybody's hat; in fact, it would take a good-sized tent to cover them. The long column on the freight car, part of a 35,000-ton forging press, weighs 94 tons. The husky cylinder for a smaller press, but even so, it will weigh 88 tons after machining and will have an OD of approximately 7 ft at the largest point.

The two forgings are giants by any standards. Bethlehem turns out plenty of big ones—some even larger than these. But don't forget, our shops are always glad to handle the smaller jobs, too—pieces weighing only a few tons, a few pounds, or a few ounces.

We mentioned hiding under a hat. A great many Bethlehem forgings could easily be covered by a hat, and not a very large one at that. For instance, we've made millions of small drop forgings and are making more all the time.

The point is, Bethlehem is equipped to produce the *full* range of forgings—everything from the midget class to the heavyweights of 100 tons and more. So don't think of us in terms of any one size-group. Whenever you're planning forgings . . . large, small, or medium . . . phone or write our nearest office. We'll do the job you have in mind and do it right!

On the Small Side



This 1 1/2-lb drop forging is as typical of Bethlehem production as the huge pieces weighing many tons.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation, Export
Distributor: Bethlehem Steel Export Corporation



Starred items are digested at the right.

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THE IRON AGE, published every Thursday by CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. \$5 for 1 year, \$8 for 2 years in United States, its territories and Canada; other Western Hemisphere Countries, \$15, other Foreign Countries, \$25 per year. Single copies, 50¢. Annual Review Issue, \$2.00. Cable: "Ironage." N. Y.

Address mail to 100 E. 42 St., N. Y. 17, N. Y.

NEWS DEVELOPMENTS

SEE STEEL LABOR COMPROMISE, PRICE HIKE — P. 97

When the dust settles, the new United Steel Workers' contract is likely to include a modest wage increase, and moderate improvements in pensions and social insurance. Cost to producers will fall between 5¢ and 8¢ per hour. Despite competitive market, a compensating price boost of \$3 per ton will follow.

BRITISH AUTOMAKERS RIDING A SALES BOOM—P. 103

English manufacturers find themselves in a seller's market once again after slump in second half of 1953. Predicted decline in export market never materialized. Domestic buyers wait months for popular models. Only sales to U. S. are lower. First quarter production tops similar period last year.

ALUMINUM FALSEWORK CUTS BRIDGE COST — P. 104

A pair of 280-ft fabricated aluminum falsework sections will soon be hoisted into place on the new Richmond-San Raphael bridge across San Francisco Bay. It's believed to be a construction first—and it permitted a bid \$7 million under the competition. Aluminum firm taking a close look.

TIME STUDIES GAIN FAVOR IN COMPETITION — P. 107

"Work Measurement" has been seen with increasing frequency on convention programs in the past year. And it's generally accompanied by hot verbal exchanges. Many report a 25 pct increase in productivity after adopting incentive plans based on job standards. Evaluation systems compared.

POWER STEERING BECOMES A STANDARD ITEM—P. 110

From optional luxury just 3 years ago, mechanical steering aids have reached the status of regular equipment. Heavy cars, soft tires make them all but a necessity on most cars. Over a million units will be installed this year. Makers are set up to cope with universal installation.

THREAT OF RETURN TO CONTROLS FADING — P. 123

Recent events in Washington have reduced the threat of price and wage controls almost to zero. U. S. refusal to be drawn into the Indochina war alone is the major factor letting out steam. Planners are still mapping emergency measures, but the urgency has definitely waned.

f the Week in Metalworking

ENGINEERING & PRODUCTION

HEIGHT USED IN REVISED STORAGE SYSTEM — P. 145

To accommodate a stepped up flow of raw materials in limited storage and handling areas calls for careful planning. Bin racks for heavy materials can be re-designed for more height and greater strength. Other storage racks deal with the problem by use of hollow, tapered corner legs which telescope to add new layers.

CAST DIFFICULT PARTS FROM MERCURY MOLDS—P. 148

Problem parts with unusual mass, thin section or contour complexity may often be most successfully precision cast in ceramic shell molds made from mercury patterns. Mercury has unique advantages in production of intricately shaped patterns. Ceramic shell molds from mercury patterns less subject to expansion.

PRECOATED STOCK CUTS PRODUCTION COSTS—P. 151

Use of precoated strip permitted several production economies in manufacture of bezel rings with seal and catch plates. The parts, used in pressure gages, match equipment colors. Inventories have been shortened, production costs on these items have been halved and inventories have been reduced.

COLD TREATED MAGNET STEEL IS STRONGER—P. 156

Use of low temperature treatment by AC Spark Plug Div. promotes uniform quality of magnets for speedometers as well as stabilizes the magnets in service. Using wrought bar steel, AC brazes 16-ft lengths together, heats automatically in an induction coil, cuts to length, forms, quenches without manual work.

NEXT WEEK—SPECIAL STUDY ON NEW ENGLAND

This special study has been months in the making; it digs deep into New England's problems, analyzes what's being done to solve them. Study shows this first and most highly industrialized area in the U. S. is undergoing industrial transition. Employment in soft goods is declining; in hard goods rising.

The study tells why metalworking is the backbone of N. E. industry, why N. E. research tops the nation, why tool builders prefer N. E. location, why labor is the most precious resource, how the area leads in financial innovations, how copper & brass are doing, plus plenty of statistics and pictures of N. E. products.

MARKETS & PRICES

ALUMINUM SETS SIGHTS ON TRUCK BODIES—P. 99

Alcoa is launching a sales campaign to convince truck body builders and fleet operators of the advantages of aluminum. Stressed are A54S alloy and a new high-speed welding method. Alcoa claims the alloy is comparable to steel in strength, and by its new method can be welded as fast or even faster.

PLASTICS HEADED FOR BEST YEAR EVER — P. 101

Conservative estimate is that the plastic resins industry this year will be up 5 pct over record 1953. Production is expected to be around 1.575 million tons, with business volume totaling \$1.575 billion. Expect increasing market in appliance field. Steady stream of new resins being introduced.

THE INVENTORY CUTBACK WE NEVER MADE — P. 115

After many months of order paring, inventories are down only 2.3 pct from their '53 high. Reason is that we had been accumulating inventories at a \$6.3 billion per year rate, but were recently cutting them \$4.8 billion per year. That's an \$11.1 billion drop even though overall stocks haven't been trimmed appreciably.

QUESTION OF STEEL PRICES MAY BE HOT TOO—P. 193

Steel prices may get as hot as the wage question. It could turn out they'll be hotter. You can be sure steelmakers will want to raise prices if wage costs go up more than a few pennies an hour. But some of steel's biggest customers already have their backs bowed to resist any move to raise prices.

STRIKE-HEDGE BUYERS START ORDER RUSH — P. 195

Hedging against a possible strike and a probable price increase has broadened the scramble for orders. Buyers at first sought tinplate, now the rush has spread to sheets, bars and other products. Peaceful contract settlement plus summer vacations will bring a letdown in July due to over ordering this month.

STEEL SETS ALUMINUM LABOR PATTERN — P. 196

Watch steel industry labor negotiations for the tip-off on what will happen in aluminum. Contracts in the aluminum industry expire a month later than in steel and the traditional pattern has been nearly identical settlements. And the effect on prices will also be similar with an increase seen as likely.



Dished heads, a common problem in the tank field are being formed in a range of sizes with a simple low cost die and without change in set-up.

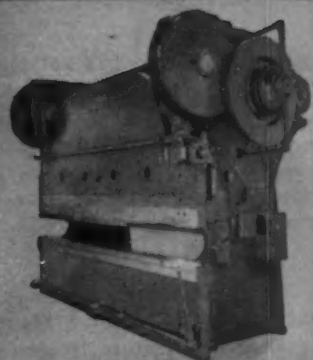
Profitable versatility for jobbing work!

Cincinnati Press Brakes are profitable for bending, punching, press work and a great variety of jobbing applications.

Cincinnati Press Brakes, with low-cost tooling, simplify difficult sheet metal and plate jobs and are versatile, profitable and busy tools in any fabricating shop.

Write for Press Brake Catalog B-4.

Photos courtesy Bishopric Products Co.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

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One of the Publications Owned and
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Editorial

The Iron Age

FOUNDED 1835

Russia Is At War With Us

SOME business people see World War III—if it comes—following traditional patterns. Others see a devastating H-bomb attack as the beginning of hostilities. Either could happen.

The longer we take to face up to the cold hard facts of Communist world aggression—and the more we let Russia and Red China get away with—the closer we come to the Big War.

But there are a lot of people who feel safe as long as the Big War is not officially proclaimed; or as long as there is no sign that an H-bomb will drop. The truth is Russia has been at war with us at various levels for some time—on her own terms. When you add up these areas their total impact is deadly.

Because Russia is already at war with us it will be a long, long time before "the good old days" return. Here's why:

Communist Infiltration At Home: It goes on with a vengeance in our industries, schools and government. The hard core of tough Communists has plenty of luck using fellow travelers and neurotic Americans to believe and disseminate its propaganda. There are plenty of legitimate gripe fests which are used successfully by the Communists for their work.

Diplomatic "Talks": Korea was not an honorable peace; the Reds had us licked with diplomacy and propaganda at every turn. Now they do the same at Geneva. As long as we fall for their clever pap and follow the lead of Eden, Russia will win this type of war.

The "Nationalist" Game: Russia and Red China have and will continue to stir up Asiatics and Africans against the free world. They have and will supply guns, ammunition and "advice" for these so-called guerrilla parties. As fast as we and our allies try to make up our minds what to do in one case the Reds will be stirring up more places.

Latin American Infiltration: Guatemala is a clear-cut example of how close the Reds are to our own land—and the Panama Canal. They have been making inroads in other South American countries while we have failed to mend our fences with our neighbors to the South.

Cessation of Geneva talks and a clear-cut message to our people as to what they really face would represent integrity to the highest degree. Real stoppage of trade with the "enemy" would hurt them. The time has come to deal in facts and not wishful thinking.

Tom Campbell

Editor

About Rolling Doors and

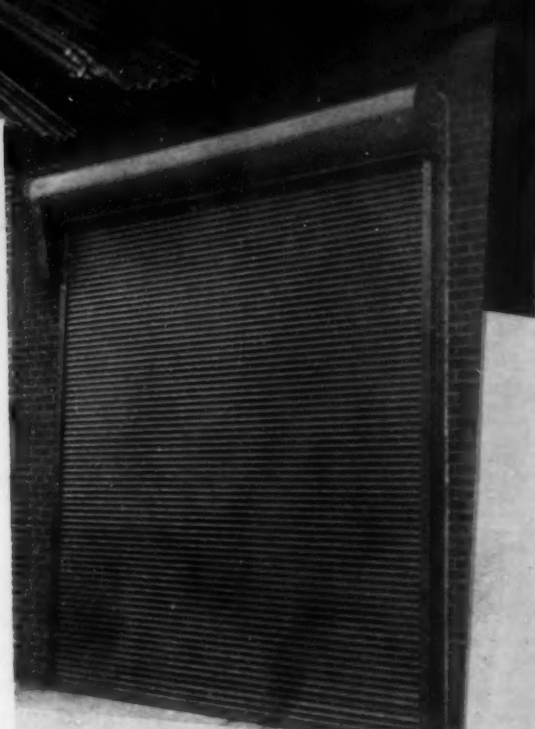
SHARON Galvanite*



Most manufacturers of the popular commercial and industrial type rolling door know about Galvanite*. They have been using it as the basic material for their product. Galvanite* withstands the weather. Its tight zinc coat assures years of trouble-free service. Galvanite* forms well under any of the popular methods and Galvanite* presents a surface that takes paint well and holds it for years.

If you're making rolling doors or any other product that must resist rust and corrosion, or hold paint exceptionally well, Galvanite* is sure to satisfy. Try it once — you'll specify it always.

*The name **Galvanite** is a trade name for a special process zinc coat steel produced exclusively by the Sharon Steel Corporation.



Type 430 Stainless and Galvanite* Coated books are available from any Sharon office.

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Dear Editor:

Letters from readers

British Reaction

Sir:

I should hate to think that you or I might drop dead before I perform the long-promised deed of telling you how much Mr. William's "Bull of the Woods" cartoon is appreciated. The other small cartoons are often good but Mr. William's are almost invariably king. In collected form they would constitute an excellent guide to human nature.

In fact, your work is the only thing that can overcome the gloom caused by Mr. Campbell's incredibly platitudinous and infantile editorials, and the possibly worse sight of people wanting copies of them and permission to reprint.

Anyway, the technical stuff is worth reading.

O. R. FORD

Birmingham, England

Old Mother Government

Sir:

Congratulations on the editorial "Old Mother Government" in the May 27 issue. It is very encouraging to see that some of the publishers in this country are aware of the dangerous trend which the Americans are following in the pursuit of security. It is too bad, however, that we are not as frank regarding the reasons behind this condition.

I believe the whole subject can be summed up in one word "propaganda." We Americans are so consistently subjected to a continuous barrage of fear, both in the form of propaganda and, I am sorry to say, in the form of advertising, there is little wonder that the weaker members of our society naturally look to some source of encouragement.

I hope you will be able to continue the good work by attacking the causes of this dangerous trend.

C. E. WOOD

Cincinnati

New Rubber Process

Sir:

We have noted with great interest mention on the Newsfront page of the May 13 issue regarding "increase in hardness in molded rubber parts . . ."

Will you kindly advise where we can secure additional information in regard to this new heat treatment process which you write about.

A. E. MERGET
Chief Chemist

DeLaval Separator Co.
Poughkeepsie, N. Y.

Further information about the new heat treatment process mentioned in the May 13 issue may be obtained from the Scintilla Magneto Div., Bendix Aviation Corp., Sydney, N. Y.—Ed.

Gear Inspection

Sir:

We wish to commend you for the publication of a very fine article, "Choose Gear Inspection Methods to Meet Product Needs," by Mr. Bohle which appeared in your May 27 issue, and would appreciate having three copies of this article for distribution within our organization.

A. J. ZINO, JR.

Anthony J. Zino, Jr.
Manhasset, N. Y.

Molybdenum Disulfide

Sir:

I would appreciate your sending me ten reprints of the article, "Molybdenum Disulfide Simplifies Extreme Pressure Lubrication Problems" which appeared in the May 20 issue of THE IRON AGE on p. 138.

L. W. GLECKMAN
Metallurgical Engineer

Wyandotte Chemicals Corp.
Wyandotte, Mich.

Another First

Sir:

I would appreciate if you would kindly send me a reprint of your article on "High Production Mill Rolls Wide Magnesium Plate" by W. G. Patton, appearing in the May 27 issue of your journal.

N. H. POLAKOWSKI

Armzen Co.
Waterbury, Conn.

Titanium Hot Extrusion

Sir:

We would appreciate your forwarding three reprints of the following article appearing in your May 13 issue: "Titanium Successfully Hot Extruded."

N. W. BASS
Vice President

Brush Beryllium Co.
Cleveland

Basic Lined Cupola

Sir:

Would you be so kind as to send us three copies of the article "Basic Lined Cupola Cuts Costs, Improves Quality" by T. M. Frazell and J. D. Sheley printed in your Apr. 29 issue.

R. W. MORRIS
Plant Supt.

Anthes-Imperial Co., Ltd.
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"I Say
Sheet Coil"



THIS IS
COLD ROLLED
**SHEET
COIL**

Produced by High Speed
Rolling on Continuous
Wide Multiple Stand
Mills and Slits to
Width

MEET US LOUISIANA WITH
PREMIUM QUALITY
COLD ROLLED STRIP

"I Say
Thinsteel"



Which kind of Cold Rolled Strip Steel is best for You ?

CONSIDER SHEET COIL

- if variations in physical characteristics are permissible.
- if fairly heavy oversize gauge variations are not objectionable.
- if the fabricating operations are not too complicated and do not require intricate expensive dies.
- if a fine surface finish is not essential.
- if a good base for paint or enamel is desired.
- if you do not object to some "square footage" loss due to oversize variation.
- then Sheet Coil will probably be the most economical material for the job.

CONSIDER THINSTEEL

- if you must have a high degree of uniformity of chemistry and physical properties—and precision gauge tolerances.
- if you wish to keep die wear low, no oversize gauge variations.
- if you require a fine finish or a better base for plating.
- if you want maximum yield for "most finished parts per ton."
- if you want selected tempers for maximum strength and lightest weight.
- then you'll find Thinsteel the most economical material by far.

No Argument Here.... Kenilworth Stocks Both



You can always count on Kenilworth helping you get the right steel for your requirements. Order Sheet Coil or Thinsteel and notice that each coil carries an identifying tag as pictured above. Call on Kenilworth, too, for your needs in Stainless Sheets or flat rolled Spring Steels (Annealed or hardened and tempered).

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HERE'S PROOF FROM REO MOTORS—

Now you can **BELT** assembly lines in spite of oil and grease



ORDINARY conveyor belts failed on the lawnmower motor assembly line of Reo Motors, Incorporated, in twelve weeks' service or less because of oil and kerosene that attacked the belts—caused swelling, flaking off and separation of covers.

The G.T.M.—Goodyear Technical Man—specified CHEMIGUM belts—designed and made to cope with excessively oily conditions. Now after being in service over six times longer than any previous belt—and still in tiptop shape—Reo writes:

"We installed one of your belts on our engine assembly line. Now, two years and scores of thousands of engines later, it shows very few signs of wear. The remarkable resistance to oil saturation and its ability to withstand constant punishment sold us on installing a second CHEMIGUM belt on another of our assembly lines. Here again we have been well satisfied."

GOODYEAR INDUSTRIAL RUBBER PRODUCTS
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BELT CONSTRUCTIONS

A GREAT RECORD in 1951 —even greater TODAY

Three years ago this amazing conveyor belt had outlasted all previously used belts by better than six to one. TODAY it's still on the job — still working — after more than 15 times the service.

Boxes and
Packaged or bagged materials on inclines

The G.T.M. can choose a belt construction for you that will best meet the exact demands of load and operating conditions found in your plant—to give you the longest possible conveyor service at lowest cost in the long run. You can talk it over with him by calling your nearest Goodyear Distributor, or writing Goodyear, Akron 16, Ohio.

FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

Chemigum—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOOD YEAR

THE GREATEST NAME IN RUBBER

Fatigue Cracks

by William M. Coffey

Mr. Purchasing Agent!

We're so proud of something the editors have just done that we want you to be the first to know. Once again **THE IRON AGE** is first with a brand new aid for Purchasing Agents. A new feature, especially for you, appears on page 195. Take a good look. We'll bet it's the first thing you'll be turning to each week. And our feelings won't be hurt, either. You can turn to us second.

Entitled **STEEL PRODUCT MARKETS** it packs into concise, quick-reading form information gained in hundreds of interviews throughout the country. For the first time in history the national picture on all major products—with area contracts—is contained on a single page.

Watch for it, use it each week... and remember that your **IRON AGE** is the only metalworking paper in America that can bring you "this week's news, markets and prices this week"...

... because **THE IRON AGE** is the only metalworking paper that is granted the special privilege of first priority "newspaper" delivery by the U. S. Post Office.

Keep sending the money.

Attention Everybody!

Be on the lookout for our special feature issue on Metal Finishing coming July 29. Remember the old one, a few years back, that turned into the famous Metal Finishing Manual? It was a classic. Guess we received more requests for this manual than anything we have ever printed. You're probably still using it. But after July 29 you can throw it away. There have been so many new techniques developed that the one coming up makes the other one old age. It will contain scores of new tables that will answer all your new questions on finishes, plating solutions, stripping, coating tests, corrosion resistance. There'll be a lot of new data on aluminum coatings. Powder metallurgy, which is growing at such an amazing rate, presents a whole new series of finishing problems. These will be covered. All in all, we're going to have something that you'll use again, again and again.

Keep sending the money.

A True Story

We ran into a professor friend who summers in Maine and was off (already) on his vacation. Very nice chap. Never will forget the time his wife asked him to cut

some curtain rods for the farm. He'd been working on gages in the shop, checking them for temperature, etc., etc., etc. So he hauled the brass curtain rods over to the shop and asked one of the mechanics to cut them to 29 inches. The professor got them back the next day with a little note:

Dear Professor D:

Sizes are marked on the rods. All are plus 0.000 in. at 70" but they run off by as much as minus 0.008 in. Hope this will be OK.

Mike

And they were OK! Mrs. D was highly pleased. Great improvement on the farm living room. End of story.

Know why we really printed this? It has a New England flavor and so will our next week's issue, the big feature issue **SALUTE TO NEW ENGLAND**. Accuracy counts in New England.

Puzzlers

The area of the triangle (May 20 puzzler) is 84 square units. Winners: Howard A. Carr, Bill Elwell, Jr., Louis Crispin, J. B. McDonald, Randolph Jones, Clifford Mack, N. H. Schermer, L. K. Roberts, Joseph F. Green, E. H. Butler, Joseph T. Chandler, Florence Craig, Stanley H. Andrews, William Shrady, N. P. Potter, Robert D. Lamb and Carl Kugelman made a nice try.

New Puzzler

We're at the end of our rope with this one.

A piece of rope weighs 4 oz per ft. It is passed over a pulley, on one end of which is suspended a weight and on the other end a monkey. The whole is in equilibrium.

The weight of the monkey in pounds equals the age of the monkey's mother in years. The age of the monkey added to the age of the monkey's mother is 4 years.

The monkey's mother is twice as old as the monkey was when the monkey's mother was half as old as the monkey will be when the monkey is three times as old as the monkey's mother was when the monkey's mother was three times as old as the monkey.

The weight of the rope, or the weight at the end, is half as much again as the difference in weight between the weight and the weight plus the weight of the monkey. How long is the rope?

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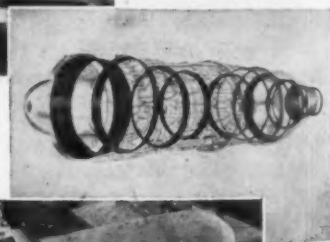
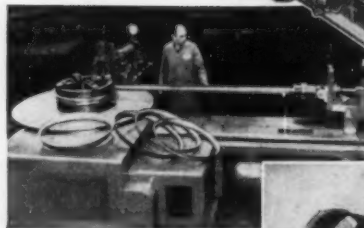
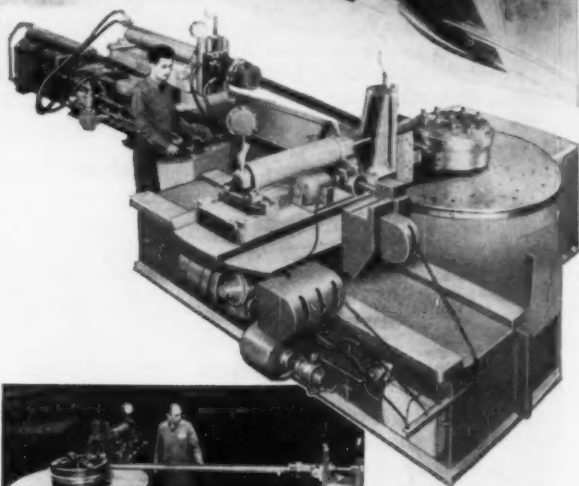
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Dates to Remember

Meetings

JUNE

AMERICAN SOCIETY FOR TESTING MATERIALS—Annual meeting, June 13-18, exhibit of testing apparatus and laboratory supplies and photographic exhibit, Hotels Sherman and Morrison, Chicago. Society headquarters are at 1916 Race St., Philadelphia.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Semiannual meeting, June 20-24, William Penn Hotel, Pittsburgh. Society headquarters are at 29 W. 39th St., New York.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Summer and Pacific General Meeting, June 21-25, Los Angeles. Institute headquarters are at 33 W. 39th St., New York.

EXPOSITIONS

ASSN. OF IRON & STEEL ENGINEERS—Annual convention with Iron & Steel Exposition, Sept. 28-Oct. 1, Public Auditorium, Cleveland. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

AMERICAN SOCIETY FOR METALS—National Metal Exposition, national metal congress, Nov. 1-5, Palmer House, Chicago. Society headquarters are at 7301 Euclid Ave., Cleveland.

CASTER & FLOOR TRUCK MANUFACTURERS ASSN.—Summer meeting, June 23-25. Association headquarters are at 27 E. Monroe St., Chicago.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS—Semiannual meeting, June 28-30, New Ocean House, Swampscott, Mass. Society headquarters are at 62 Worth St., New York.

JULY

AMERICAN ELECTROPLATER'S SOCIETY—Annual convention, July 12-15, Statler Hotel, New York. Society headquarters are at 445 Broad St., Newark, N. J.

WESTERN PLANT MAINTENANCE SHOW—July 13-15, Pan Pacific Auditorium, Los Angeles. Management: Clapp & Pollak, 341 Madison Ave., New York.

TRUCK-TRAILER MANUFACTURERS ASSN., INC.—Summer meeting, July 22-23, Edgewater Beach Hotel, Chicago. Association headquarters are at National Press Bldg., Washington.

AMERICAN HOME LAUNDRY MANUFACTURERS' ASSN.—Semiannual meeting, July 25-28, Grand Hotel, Mackinac Island, Mich. Association headquarters are at 20 N. Wacker Drive, Chicago.

AUGUST

MINING ASSN. OF MONTANA—Summer meeting, Aug. 1-2. Association headquarters are at 505 Montana Standard Bldg., Butte, Montana.

SEPTEMBER

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Fall meeting, Sept. 8-10, Schroeder Hotel, Milwaukee. Society headquarters are at 29 W. 39th St., New York.

METAL POWDER ASSN.—Fall meeting, Sept. 10-12, The Homestead, Hot Springs, Va. Association headquarters are at 420 Lexington Ave., New York.

INSTRUMENT SOCIETY OF AMERICA—International Instrument Congress and Exposition, Annual meeting, Sept. 13-24, Philadelphia. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

NATIONAL METAL TRADES ASSN.—Annual Eastern plant management conference, Sept. 15-17, Sagamore Hotel, Lake George, New York. Association headquarters are at 122 S. Michigan Ave., Chicago.

COMPRESSED AIR & GAS INSTITUTE—Sept. 15-17, Skytop Lodge, Skytop, Pa. Institute headquarters are at 90 West St., New York.

NATIONAL PETROLEUM ASSN.—Annual meeting, Sept. 15-17, Atlantic City, N. J. Association headquarters are at Munsey Bldg., Washington.



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The new engineering developments which have taken place in the Roto-Finish laboratories open the door wide to entirely new applications and entirely new principles in mechanical surface finishing. Therefore, whatever your finishing problem, we urge you to ship us two finished and several unfinished samples of parts you may wish to have us process in our laboratories. Remember, Roto-Finish guarantees the same result in your shop, as on the samples processed in their laboratories.

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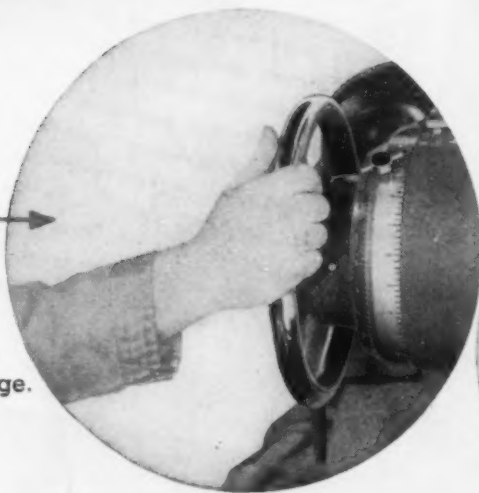
It's the finish that counts

6 REASONS FOR INCREASED GRINDING



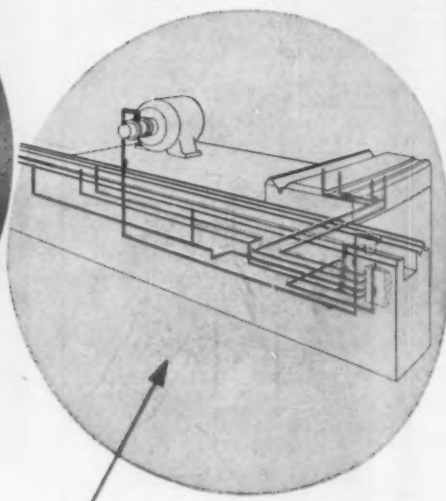
LANDIS TOOL 10" x 48" Type CH Plain Grinder. Catalog B-50.

EYE LEVEL WHEEL FEED and grinding visible to operator at all times. Eliminates awkward movements and reduces chance of work spoilage.



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CONTROLLED WAY LUBRICATION assures proper lubrication at all times. Pressure safety switch eliminates chance of damaging accurate ways.

THE IRON AGE Newsfront

TACONITE PRODUCTION HAS BEEN INCREASED by a change in the method of sintering pellets. Formerly tunnel kilns were used. Now a moving grate type sintering machine, has greatly increased capacity. Sintering is accomplished by blowing hot air through the grate.

IMPROVED OIL ECONOMY is claimed for a crankcase oil which provides the characteristics of both light and medium heavy oils. Tests show oil mileage up 20 pct and fuel mileage improved 14 pct.

AIRCONDITIONING FOR MANUFACTURING plants is moving ahead steadily. But it's being largely applied to smaller plants. Best results are obtained in plants specifically designed for air conditioning.

HIGHER PRODUCTION RATES in cold heading operations, plus greater blank capacity are possible with a new solid die double stroke header. Headed blanks 1/2 in. in diam and 6 in. long under the head can be produced from an 8 in. maximum wire cut off, at 80 per minute.

RESEARCH ON GAS TURBINES at GM has made plenty of progress in solving problems connected with heat radiation, braking, bearings, and development of a heat resistant blade material. Improved fuel economy is the next target.

CARBON LINED CUPOLAS continue to chalk up savings for foundry operators. One operator reports coke requirements for starting a banked cupola have been cut considerably. Another company reports basic lining refractory repair costs sharply reduced.

BETTER TRANSMISSIONS are in your car future. With most automakers committed to present engines for another decade, new pressures are being placed on transmission design. At least two popular transmissions will be vastly improved by 1955. Long range effort will be toward better engine-transmission synchronization.

HIGHER OCTANE GASOLINES with increased compression ratios are definitely on the way. Reason: A 98 number octane gas can increase economy and performance with only a moderate boost in engine compression ratio.

AUTOMATIC TRANSMISSIONS FOR TRUCKS are making substantial gains, despite many obstacles. A possible solution for extremely heavy duty operation is the use of two smaller standard transmissions.

TIME BETWEEN CASTING AND FINISH ROLLING of steel ingots is reported considerably shortened by a hot skinning process being tried in Europe. A special hot milling machine has been developed for the operation. Ingots are stripped at 1472°F, reheated to about 2020°F, milled on four sides in about 7 to 8 minutes, and sent directly to the blooming mill.

forged spindles are now turned *200% faster*

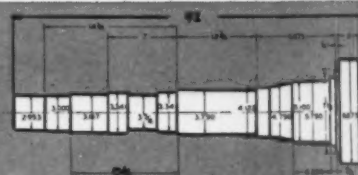
with the new Axelson Trace-o-Matic
 Hydraulic Tracer Attachment

The Trace-o-Matic attachment provides fast, automatic precision duplication from flat templates and is adaptable to all classes of work including contour turning, boring and facing. It takes full advantage of the ability of Axelson lathes to take heavy uninterrupted roughing cuts or fine finishing cuts to very close tolerances without the need of a highly skilled operator.

Many outstanding features are designed into the Trace-o-Matic which make it exceptionally economical to own and to operate. Only simple, inexpensive flat soft steel templates which serve for both roughing and finishing are required. Templates can be readily made in your own shop by turning in a bar holder or any other method. In addition, only simple single point tools are required and expensive form tools are completely eliminated. Set-ups require only minutes and after the machine is set to turn the first work diameter it is automatically set to produce all diameters and contours from the template. Small lots or large quantity production work can be handled with equal efficiency and economy.

Your turning costs can be greatly reduced and your production increased by installing a Trace-o-Matic on your present Axelson lathe or by ordering it on a new Axelson lathe. It will pay you to look into the matter without delay!

Write for Axelson's 16-page bulletin describing the New Axelson Trace-o-Matic attachment in detail, or call your nearby Axelson distributor. 6150 Boyle Street, Los Angeles 58, California



PERFORMANCE DATA

Part	MACHINE SPINDLE
Machine	Axelson 20" lathe with Trace-o-Matic attachment
Number of Pieces	6
Material	4820 Steel Forging
Hardness	180 Brinnell
Max. Depth of Cut	3/4"
Greatest Precision	±.003"—.000"
Tool Material	Tungsten Carbide
Floor to Floor Time	64 Min. with Trace-o-Matic
Floor to Floor Time	129 Min. Former Method
Production Increase	200%



HEAVY DUTY



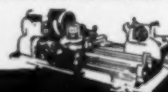
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STEEL: Expect Package Deal, Price Hike

Union-management negotiators expected to settle on 5¢ to 8¢ compromise package . . . Compensating price boost would be \$3 per ton . . . May extend deadline—By J. B. Delaney.

It's still a good bet the steel labor settlement will be based on a "package" that will increase industry employment costs as much as 8¢ an hour.

When the dust settles, the new contract is likely to include a modest wage increase and moderate improvements in pensions and social insurance. This will cost steel producers between 5¢ and 8¢ an hour.

Despite competitive market conditions, a compensating price increase averaging \$2 to \$3 per ton will follow. Indications are that the steel market will get no worse over balance of the year, is likely to show a slow but steady improvement. The industry's chances of maintaining a higher price level are good.

McDonald's Position Is Key

This outlook is not to the industry's liking. That's why initial counter-proposals to the far-reaching demands of the United Steelworkers were modest enough so that producers probably would have absorbed the additional cost without advancing prices.

Whether a peaceful settlement is reached hinges to some extent on how intensely David J. McDonald, USW president, feels about his position as a national figure in organized labor. He makes no secret of his animosity toward Walter Reuther, president of the United Auto Workers and the Congress of Industrial Organizations, of which the USW is a member—for the moment at least.

He is not likely to settle for anything that might tend to lower his stature in the national labor

movement. He may want to press for concessions that would put him away out front. This would increase chances of industry resistance and a showdown strike.

Don't Differ Much

Apart from the McDonald-Reuther feud angle, prevailing opinion is that chances for a peaceful settlement are at least 50-50 despite the wide difference between initial industry counter-proposals and USW demands.

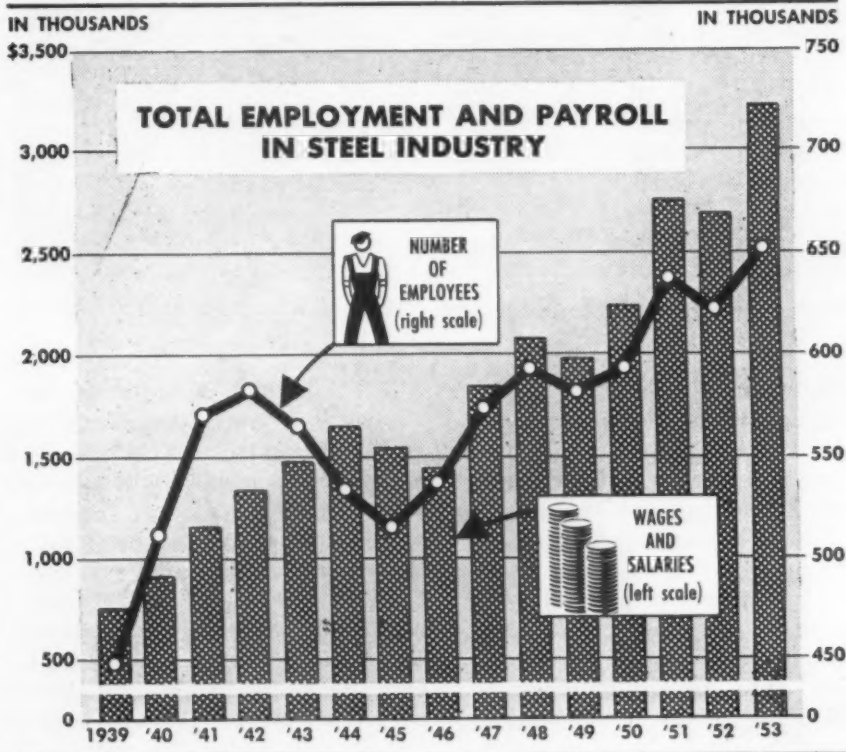
Actually, industry and union negotiators are not so far apart as they appear on the surface. The industry was not expected to offer concessions that would force them to raise prices. After its demands became public, the union admitted

most of them were long-range goals rather than immediate objectives (THE IRON AGE, May 27, 1954, p. 73).

At the pattern-setting sessions in Pittsburgh between the union and U. S. Steel Corp., both sides were pledged to say nothing about the company's counter-proposals. But indications were the company rejected the union's demand for a wage increase and the guaranteed wage and offered to improve pensions and social insurance (THE IRON AGE, May 6, 1954, p. 77). Efforts to hammer out a compromise were intensified this week.

Wants Other Improvements

Some industry leaders concede that the pension program could stand improvement; others contend it's already one of the best in industry. Last year, the pension program cost steel producers



Employment continues on the upgrade . . .

Improvement in the national employment picture is evident from the rise in the number of persons at work and a concurrent decline in joblessness to about 3.3 million.

New statistics from U. S. Labor Dept. and Commerce Dept. show the number of employed persons rose by 500,000 in a month to a total of 61.1 million in early May. This brought the figures on workers to a point just a half-million below the May, 1953, level.

A gain in farm employment, which had reached 6.8 million at the latest count, more than offset a drop of 200,000 in nonfarm jobs. This latter category, made up of paid and unpaid employment and self-employed work, included 54.3

million persons in May this year.

While there was a decline of 193,000 in manufacturing industries between April and May, employment in durable goods plants showed signs of becoming firmer. Similarly, there was continuing evidence of job stability in non-durable goods manufacturing.

All told, employment in manufacturing added up to 15.8 million in May.

Seasonal employment gains, especially in outdoor work, are still being noted, and in about half the nation's major job centers employers are forecasting more hiring through mid-July. Among manufacturing firms alone, employers in two-thirds of the centers expect no important changes in payrolls.

. . . but more areas have jobless problem

Sixteen major industrial areas and 15 smaller ones are added to the Labor Dept. list of communities with "substantial unemployment," bringing to 123 the areas now eligible for special government contract consideration.

At the same time, the Department predicted that no "significant changes" in the employment situation will occur before mid-summer. May unemployment decreased only slightly from April levels, which was termed "normal."

Areas added to the list of those with 6 pct or more of their labor

force out of work were: Buffalo, Utica-Rome and Albany-Schenectady-Troy, N. Y.; Erie, Pittsburgh, Philadelphia and Reading, Pa.; Aurora, Joliet and Peoria, Ill.; Evansville and Fort Wayne, Ind.; Fall River, Mass.; Jackson, Miss.; Knoxville, Tenn.; and St. Louis, Mo.

Four major areas were also added to the list of "moderate unemployment" areas: Chicago, Grand Rapids, Mich., Lancaster, Pa., and Norfolk-Portsmouth, Va.

Seven of the nation's 149 major industrial areas have 12 pct or more unemployment. These are

Altoona, Johnstown, Wilkes-Barre, Hazleton, Pa.; Lawrence, Mass.; Providence, R. I.; Kenosha, Wis.; and Ponce, Puerto Rico. Thirty-one smaller areas are also in this category.

Average Steel Wage Up in April

Wage earners in the iron and steel industry in April pocketed an average \$2.296 per hour compared with \$2.278 in March and \$2.203 in April last year, according to American Iron and Steel Institute. Average for the first 4 months of this year was \$2.292.

If cost of pensions, social security and insurance are included, the April cost would be about \$2.469.

Total estimated payroll of the industry in April was \$232,638,000 compared with \$249,672,000 in March.

Industry wide employment was estimated at 609,400 in April, against 620,500 in March. Wage earners worked an average of 35.8 hours per week in April.

Unions Sign Non-Raiding Pact

Non-raiding pact between 94 CIO and AFL unions is hailed as "further evidence that the working men and women of America can solve their own problems without governmental interference or intervention" in a statement by Secretary of Labor James P. Mitchell.

Pact is between 65 AFL and 29 CIO unions with an estimated membership of 10 million. It will remain in effect at least until Dec. 31, 1955.

Special Report

Continued

an average of 10.5¢ an hour, including funding for past and current service.

But this average will decline as funded programs are brought up to date. Minimum pension for 25-year men, including Social Security, is \$100 per month. The union would like to increase this, probably would settle for 25 pct raise. Auto industry minimum is \$137.50 but this is offset by other advantages in the steel program.

Mr. McDonald would like the industry to take over completely on social insurance, now funded by employer-employee contributions averaging 2½¢ an hour. He also wants extensive improvements that would drastically increase the cost of the program. He has been under pressure from members who feel hospital and medical care runs too high for their pocketbooks even with the benefits payable under the program.

Mr. McDonald is expected to point out that the non-contributory principle has been established in pensions, should be carried over to social insurance.

Current union agreements expire June 30, with few exceptions. Mr. McDonald says he does not consider the expiration date a strike deadline, indicating he might be willing to extend the agreement if a settlement is anywhere in sight.

ALUMINUM: Aim at Truck Body Market

Alcoa steps up sales push to truckers, body builders . . . Stresses A54S alloy, new high-speed welding method . . . To compete with steel in fat market—By J. B. Delaney.

Aluminum is getting set to increase its share of the truck body market—at the expense of steel.

Aluminum Co. of America this month and next is pushing a concentrated campaign to sell truck body builders and fleet operators on the merits of aluminum as opposed to steel.

Push Alloy Welding

This campaign supplements the usual aggressive selling job done by Alcoa and other aluminum producers in this lucrative market the year-round.

Alcoa has armed itself with two new selling points: (1) a new high strength alloy—A54S—and (2) a high speed consumable electrode welding process—both developed by Alcoa research engineers.

Alcoa says its new alloy compares favorably in tensile strength with carbon steel, will increase its chances in the dump truck field. It says the new welding process means that aluminum may now be welded at speeds comparable to or in excess of steel, overcoming a serious problem in aluminum fabrication.

What They Sell

The aluminum industry looks at the automotive field generally as a juicy plum in terms of potential sales. Alcoa estimates the potential will have exceeded 1 billion lb of aluminum by 1970. Aluminum producers will be happy with a small fraction of this, are confident they'll do better than that. Current aluminum sales to the automotive industry are an estimated 150 million lb annually.

Aluminum's inroads into the truck body market have been based on these primary selling points: (1) less weight, (2) reduced maintenance, (3) greater payload, (4) reduced wear and

tear on tires, brakes, clutches, and other moving parts, and (5) gasoline savings.

These advantages, say aluminum producers, more than offset higher initial cost in relation to steel.

Eye Truck Bodies

Aluminum and steel are about in balance in the trailer field, although a major builder of stainless steel trailers recently began producing aluminum trailers as well. Some authorities say use of aluminum in trailers has reached the point where aluminum is not



ASSEMBLING aluminum truck body at plant of Duralite Manufacturing Co.

likely to make further inroads.

An ally of aluminum in the trailer market are the gross weight laws of the various states. This encouraged a switch from steel to aluminum as fleet operators sought to squeeze the last ounce of payload into a trip without violating weight laws.

Aluminum producers are focusing on truck bodies for vehicles in the weight range of over 5000 lb to 14,000 lb. They figure the 1954-55 market consists of about 155,-

000 units; that the average per year between 1956-60 will be 227,000. They also have their eyes on dump trucks, of which approximately 50,000 are produced each year. The average aluminum truck body weighs about 1000 lb.

To encourage body builders, Alcoa has developed a series of extruded sections applicable to all the principal truck-body types. "Proper use of these sections," says Alcoa, "permits fabrication by either subassembly, or unit construction on the truck chassis."

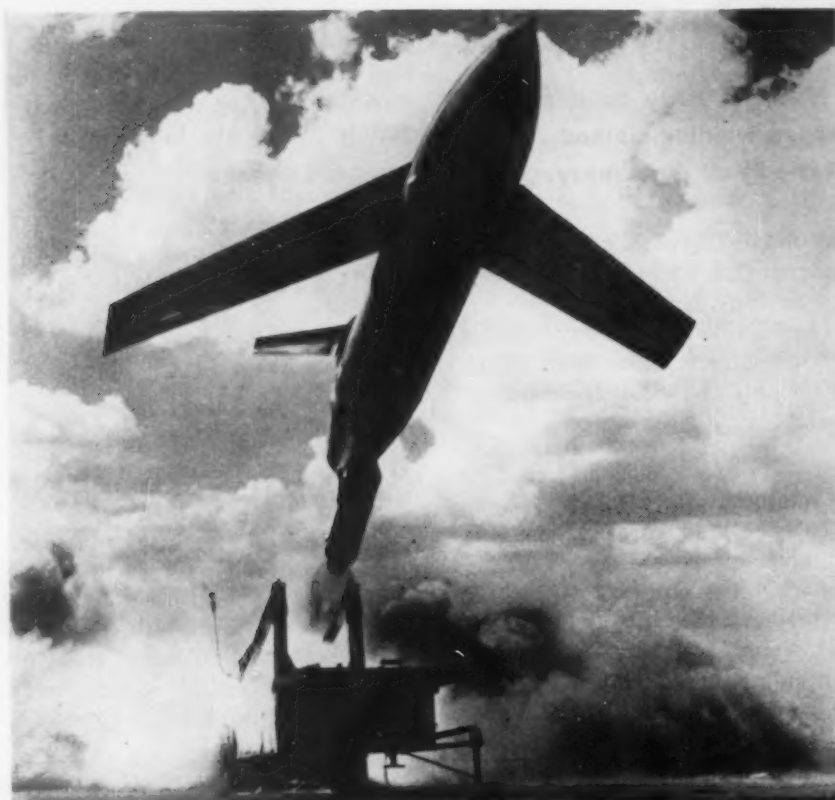
Will Probe Mercury Prices

Shortages of mercury and other critical materials are to be examined by a Senate Armed Services subcommittee which wants to find whether artificially boosted prices are wasting government funds used in buying these items.

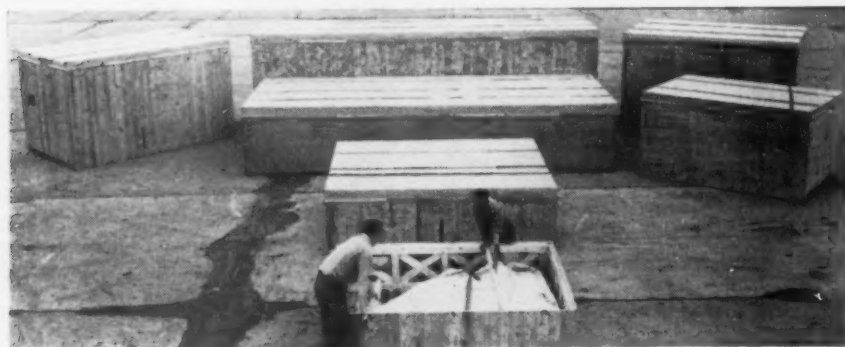
The subcommittee, comprising Sen. John S. Cooper, R., Ky., and Lester C. Hunt, D., Wyo., will first investigate the scarcity of mercury. Price of this material has climbed by about 50 pct recently.

Inadequate supplies, according to U. S. Commerce Dept., have prompted the agency to issue a new order requiring validated licenses for export of mercury except to Canada.

Bureau of Foreign Commerce has added mercury to its positive list, schedule B, No. 664565.



MOBILE launcher, "world's smallest airport" is smaller than bomber.



CRATES contain complete Matador, are not marked with contents.



Missiles:

**Matadors shipped in crates
... Assembled in field.**

Complete interchangeability of seven major subassemblies permits the Martin Matador to be boxed at the factory, shipped anywhere in the world more easily, and assembled just before launching.

The Air Force Matador, officially designated the B-61, is a pilotless bomber which carries out its mission by remote control. With a Matador squadron now in Germany, it's the first pilotless weapon sent overseas.

A second squadron is now being trained in the use of the ground-to-ground weapon at the Missile Test Center at Cocoa, Fla.

To the mobility of the crates is added protection from the elements. They may be stored for years, according to Martin Aircraft Co. And since the parts are fully interchangeable, crates may be scrambled and bombers can still be put together. This is a definite contrast to usual aircraft practice where complete factory assembly was a must.

World's Smallest Airport

The crates contain three separate fuselage sections, wing, fin and stabilizer and the instrumentation. Crates are unmarked, give no hint of the deadly weapon they contain.

But you need an airport to launch it, don't you? Well, yes—but Martin calls it "the world's smallest." About the same length as the Matador itself and much narrower than the bomber's wingspan, the launcher is roadable.

Unrestricted by human frailty, the pilotless plane can accelerate to flying speed in its own length. Takeoff procedure is as follows: Matador is raised to the proper angle and the turbojet power plant is given a further boost by an auxiliary rocket which falls free as soon as its energy is exhausted.

SEVEN subassemblies are crated, assembled when and where they're needed.

PLASTICS: Headed for Best Year Ever

Conservative estimate is plastic resin business will be up 5 pct from record '53 . . . Production expected to be 1.575 million tons . . . New products—By K. W. Bennett.

The plastics industry marketed an estimated 1.5 million tons of plastic resins in 1953, for a record \$1.5 billion sales volume, topping 1952, by almost 30 pct. Current year is certain to beat 1953, only question is by how much.

Society of the Plastics Industry early this year forecast a cautious 5 pct increase in total plastic resin production.

This would bring output up to 1.575 million tons, would raise business volume to \$1.575 billion. With Cleveland sweltering in 90°-plus heat last week, a sampling of registrants at the Sixth National Plastics Exposition saw business prospects for 1954 warming with the weather.

Say Business Is Better

Dr. Leopold Eckler, general manager of Celanese Corp.'s plant division, indicated that his division will outpace last year's sales by a substantial margin—polyester resins, particularly, he said, are only beginning to find their potential use.

The president of a firm marketing a broad line of resins indicates that he'll surpass last year's level by 10 pct on the basis of business thus far this year. Another supplier has been exceeding last year's sales by "5-10 pct since February," and another, by 15 pct.

There had been some lagging in plastics sales, particularly to molders earlier this year, but now orders are starting to come in again.

The long range outlook: with a \$1.5 billion income last year, the plastics industry is shooting for an \$8 billion rate by 1975. The increase in the past 20 years is called "fortyfold."

The chemical industry, a close relative, has been expanding at 4-5 times the rate of other industrial groups. And those who say

plastics take 17 pct of chemical output, believe the figure will be 32 pct by 1975.

What's New in Plastics

Part of the booming good health of plastics is due to research. About 3 pct of the sales dollar is consumed in research. Said one salesman, "If I leave the office at 10 a.m., I make it a point to check in at 4 p.m. to find out what new products I'm carrying."

There was some justification for this approach. Among exhibitors, one firm offered five new resins. Another, four new fire retarding materials. Another, five new polyester resins. (Polyesters continue to move up rapidly: 8.5 million lb produced in 1950; 19 million in 1952; 26 million in 1953; estimate for 1954, 35 million lb)

Another firm introduced a new reinforced plastic sheet for foun-



PLASTIC HOUSE was exhibited by U. S. Rubber Co. at National Plastics Exposition in Cleveland last week. Panels are made from Vibrin resin and fibrous glass.

dry sand core dryers, and several new high impact phenolic molding compounds.

Attracting particular attention were expandable polystyrene beads made by Koppers Co., Inc. They are buoyant, controllable in density, have a section weight of 3 lb per sq ft, will support a weight of 2 tons per sq in. Manufacturer believes they will find use as insulation for appliances, aircraft sandwich construction, buoyant equipment and in packaging.

Also reported were radiated polymers that are tougher, have a higher softening point and better formability. For the construction industry: reinforced 9 x 4 ft plastic sheet in color said to have a strength-weight ratio equaling steel.

More for Appliances

A second and equally strong reason plastics industry is optimistic: new applications for available materials are still on the rise. Air conditioners, using an increasing quantity of plastic parts, are calculated to move from 1.075 million units marketed in 1953 to 1.5 million in 1954. And though some appliance producers have found the refrigerator market slow, long range forecasts call for a doubled refrigerator output in the next 10 years, with increasing use by these manufacturers of polystyrene, phenolics, vinyls, acrylics, and polyesters.

Foam insulation is regarded as having a long way to go before it realizes full market potential. In radio and TV, Sylvania organized its plastic department in 1945, now can produce 1.5 to 2 million parts per day in plastic.

The commercial TV-color tube is being marketed with a plastic base. Plastic dies and tooling, plastic boats and truck bodies, tanks, and piping, are still on the way up.

Forming equipment is also stepping up rapidly in speed and volume. Modified Australian and British high cycle injection molding machines have been coming in with fair acceptance, and Amer-



Multiple-part Red-Strand Slings handle heaviest loads, and are easy to apply to both the load and the crane hook. User tests in Detroit proved Red-Strand slings withstood unusual abuse, yet maintained higher-than-rated strength. A Gary plant uses Red-Strand single-part slings for many lifting jobs like this. These slings are available with various combinations of end fittings for attaching the sling to rings or lugs.

How to Select the Correct Sling for Your Job

Start your sling selection by analyzing five factors:

1. The load—its size, weight, shape, finish.
2. Working area, amount of head room.
3. Size and type of crane hook.
4. Angle of sling legs.
5. Location and type of lugs or rings, if any.

From this information your supplier can recommend the sling by type, size and length that is safest, longest lasting and most economical for your job.

Types of Slings

Multiple-part slings are always recommended for heavy duty service, because for equal strength they are far more flexible than single-part slings. They hug the shape of the load easily, present a greater bearing surface to the load, and reduce the possibility of marring surfaces.

Where these factors are not so important, either Red-Strand *single-part slings* or *grommet slings* may be used for economy. Single-part Red-Strand slings are often recommended for lifting lighter weight objects, or those that have fixed attaching rings or lugs. Grommet, or continuous strand Red-Strand slings are ideal for forming hitches of various types without fittings.

Extra Savings

Two suggestions will help you save money on slings.

The first is to re-use Pin-Lock thimbles on multiple part slings. These exclusive Leschen Pin-Lock thimbles cut sling costs on an average of 21% because they may be used again and again. They lock into sling loops with pins instead of permanent clamps, permitting re-use, and eliminating constant expense of thimble replacements.

The second suggestion is to use Red-Strand slings because they are made of higher-than-rated quality Leschen wire rope that delivers longer-than-expected service.

Get a copy of Leschen's *Sling Handbook* for complete information. Ask your Leschen man for one, or write.



When you re-use Pin-Lock thimbles you reduce sling costs by 21%

LESCHEN WIRE ROPE DIVISION

The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri



Raw Materials

ican equipment, as demonstrated at the exhibit, is moving up rapidly. An increasing amount of metalworking equipment, including presses, deburring equipment, grinders, heat treating and conveyor equipment is also finding use in plastics.

Presses, which have been selling in the plastics field for many years, are also doing well in the powdered metal industry.

Though the general movement is up, selling plastic materials still takes legwork. And often salesmen find consumer education long and low paying.

Stockpiling:

Lead, zinc buying first step in long-range plan.

First step in the Eisenhower Administration's long-range program of stockpiling critical and strategic metals and materials will begin immediately with purchases of lead and zinc.

The opening Office of Defense Mobilization directive is for the General Services Administration to contract for newly-mined domestic lead and zinc through the balance of the fiscal year ending June 30. A second directive for the two metals will be issued shortly after July 1.

Quantities, Terms Are Secret

Purchase directives for other items to meet the long-term stockpile buildup authorized by President Eisenhower in March will also be made after the beginning of fiscal 1955. It is expected that some 35 metals and materials, including 14 for which the stockpile is still short, will be purchased.

Quantities and prices of all purchases will be kept secret. There are presently 75 minerals and materials on the stockpile list.

Stockpiles of 38 strategic materials are in "good shape"; 12 are "not too far away" from stockpile goals; 11 are in "fair shape" and 14 are still short, according to ODM head Arthur S. Flemming.

AUTOS: British Builders Ride Boom

Export decline never came . . . Home consumption climbed this spring . . . Production rate tops '53 . . . Waiting lists again . . . German competition a threat—By F. H. Harley.

British auto manufacturers are still riding high on the crest of a prosperity wave. Car production continued at a high level in April 1954 following records set in each preceding month of the year. Domestic sales have revived this spring, but the main strength of demand comes from export markets. Overseas order volume has held at a high level which has surprised most manufacturers, who were expecting a decline.

Production Soars

In the last half of 1953, production caught up with demand so that domestic buyers could almost pick their cars out of dealers' windows. Now, delivery of the popular models has slowed down again.

Dealers are once more in the position of having to apologize because some models are not readily available. For many models there is a wait of several months. This demand has surprised dealers who report that much of the present buying is on credit.

April production of cars was 58,224, or a weekly average of 14,556, compared with 73,534 in the 5-week period of March, or a weekly average of 14,707. Daily production in April was slightly higher than in the preceding months due to the Easter holidays.

In the first 4 months of this year car output totaled 241,392, compared with 173,369 in the corresponding period of 1953, a gain of more than 68,000 units.

U. S. Imports Lag

Exports in the first 3 months of 1954 numbered 84,306 units, 17,168 more cars than in the first quarter of last year and well over one-half of the quarter's production.

Australia remains Britain's best customer for automobiles, taking 17,241 cars in complete or knocked-down form during the first quarter.

Canada imported about 500 more

vehicles than in the first 3 months of 1953 (5843 compared with 5325), but the U. S. took fewer (7517 compared with 9805).

Commercial vehicle production in April was 18,137, a weekly rate of 4534. Total for the first 4 months of 1954 was 82,942, compared with 77,825 in the corresponding period of 1953.

Overseas shipments of commercial vehicles for the first quarter numbered 32,771 units, the best quarter since the second 3-month period of 1952. Tractor exports in March of 10,291 units, were the highest since May 1952. March exports of parts and accessories were the best in 2 years.

Germans May Compete

German competition has not yet hit British manufacturers but its potential worries them nevertheless. The Volkswagen works is running all out and currently is shipping cars to export markets at a rate of nearly 100,000 a year.

Exports of this "people's car"

numbered 35,500 in 1951, 46,650 in 1952, and 69,120 in 1953, and according to Dr. Heinz Nordhoff, Volkswagenwerk boss, the figure for the first 4 months of this year is already 31,000 cars, with a 6-month delivery wait.

The Volkswagen factory is a bare 10 miles from the Soviet zone and three-quarters of the workers in the plant once lived there. They are working like mad to keep up the production and keep the selling price down—to keep their jobs and their standard of living.

U. S. Can Ship More to Benelux

Primary iron and steel products, machine tools, and hydraulic presses are among the U. S.-made items which now may be imported without quantity limitations by the Benelux nations—Belgium, the Netherlands, and Luxembourg.

Other durable goods which may be shipped more freely into those countries as a result of a new action by the Benelux governments include locomotives, airplanes, electric generators, typewriters, and roller and ball bearings.

U. S. Commerce Dept. points out that only quantity restrictions, not too severe on most of these items the past year, are affected by the new action.



AUSTIN A-30 sedan (shown with left-hand drive), one of Britain's most popular cars, delivers more than 30 miles per gallon of gas.

BRIDGES: Use Aluminum Falsework

Develop light metal sections for new San Francisco Bay Bridge . . . Believed first aluminum falsework . . . Permit low bid \$7 million under competition—By T. M. Rohan.

Steel will get a big lift from aluminum in the West in a few weeks.

Judson Pacific Murphy Co., Emeryville, Calif., currently building the \$62-million Richmond-San Raphael bridge across San Francisco Bay, is preparing to hoist the first of two 110-ton, 280-ft fabricated aluminum falsework sections 150 ft over the bay from barges. It is believed to be the first such use in construction history.

Among The Biggest

Supported by vertical wooden piling attached to existing steel towers, they will form a platform for hoisting steel sections and riveting them into place. Ironworkers will thus have a safer working platform, integral with the bridge, rather than off unstable barges.

The aluminum spans—costing

\$100,000 each—are one of the largest structural applications in history. Only larger ones tonnage-wise are an arch-type bridge in Canada and the Alcoa building in Pittsburgh. The lift scheduled for about 2 weeks hence will be filmed for later national telecasting on Alcoa's Edward R. Murrow program.

Cost Savings High

Alcoa, which furnished the aluminum and has eyes on a major new market, has watched progress of fabrication closely. Three delegations of engineers from Pittsburgh headquarters have inspected the job and high-ranking visitors are expected for the first lift.

Channels up to 12 x 13 in.—plate to $\frac{3}{4}$ in.—and angles to $\frac{5}{8}$ in. were rolled at Alcoa's Massena, N. Y. mill and constituted 90 pct of tonnage. Largest truss sec-

tions, made of plates and angles, measured up to 27 $\frac{1}{4}$ x 19 in. The heavy sections and necessary lengths of up to 75 ft approached maximum limits at Massena, one of the largest U. S. aluminum mills.

Use of aluminum falsework will cost only about \$8 per ton of steel erected compared to as high as \$70 a ton for equivalent steel falsework, J. Philip Murphy, Judson Pacific Murphy president, told THE IRON AGE last week. This is due to elimination of separate piling for steel falsework, erection of falsework bents, and elimination of special heavy-lift crane in the 200-ton class.

Why Use It

The sections will be used 36 times for a total of over 25,000 tons of steel in 36 of 42 center spans. On completion, the aluminum can be used on similar jobs elsewhere and also has about one-third market price as scrap. Steel rivets were used in the assembly since equipment was readily available and personnel had knowhow.

Major reasons for using aluminum:

1. It will eliminate prospect of floating out and lifting 350-ton steel trusses 150 ft in the air in heavy tide. Tides in upper San Francisco Bay run 6 knots.

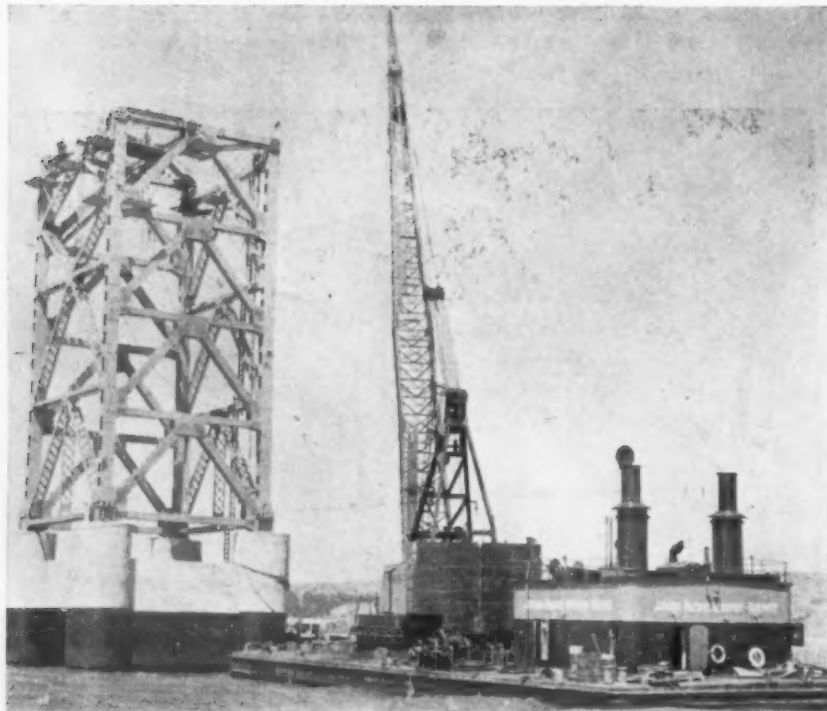
In constructing the nearby Oakland Bay Bridge, huge barges and derrick cranes were necessary to accomplish the job.

2. Building of a 200-ton derrick barge will also be eliminated, since maximum lift will be the aluminum sections with about 56 tons for each of the cranes. Maximum lift of steel sections will be about 75 tons.

3. Expensive piling necessary for steel falsework is replaced by less costly timber supports.

Heat Treat I Bars

Lifting of the first aluminum section and following steel will be made by one 75-ton double boom traveling crane currently being assembled on top of a completed tower and a second 90-ton barge crane with a boom 148 ft high.



RIVETERS affix top struts on fixed tower of Richmond-San Raphael bridge

The second boom on the tower crane will be used to hoist the second falsework section on adjacent sections of the bridge and move back and forth over completed steelwork as needed.

Steelwork sections will be moved 3 miles to the bridge by barge from a leased 40-acre area at Richmond, Calif., site of the wartime shipyard, and another 45-acre site. Rivets will be passed up by pneumatic tube after heating on the barges.

Ahead of Schedule

One link with past bridgework in the area is use of 1500 tons of heat-treated I bars, similar to those on the San Francisco-Oakland Bridge but seldom used in bridge-building today. These were made on special order by By-Products Steel Co., a division of Lukens at Coatesville, Pa. Over 1600 tons of expensive manganese-vanadium steel is also used in cantilever spans for greater strength without adding to pier loads. Over 20,000 tons of silicon steel is also used to lighten the load.

The new bridge will complete



ASSEMBLING one of two 110-ton aluminum falsework sections for the \$62 million bridge.

the triangulation of San Francisco Bay, replacing an overloaded ferry service.

The job, which was the biggest yet for Judson Pacific Murphy, was started in March 1953 (THE IRON AGE, Mar. 5, 1953, p. 137) and is expected to be completed in late 1956. At \$21 million, Murphy and Peter Kiewit & Sons of Omaha were low bidders on steel superstructure by almost \$7 million under American Bridge and Bethlehem, and first independent contractors in the area to get a job of this size. Due to the present low state of operation in western fabrication, deliveries of steelwork subcontracted to Consolidated Western Div. of U. S. Steel and Bethlehem-Pacific is 6 months ahead of schedule. The very tricky piling work of 41,000 tons of structurals and 25,000 tons of H section foundation piling is also about 2 months ahead of schedule.

Building:

Boom scores new rise in May to record \$3.1 billion total.

The booming building industry scored another rise in May as total expenditures for new construction climbed to a record \$3.1 billion.

Private spending for residential building exceeded \$1 billion, while commercial building reversed its downward drift of the past several months and advanced to \$493,000.

Record expenditures of \$13.2 billion for the first 5 months of the year resulted from unprecedented activity in construction of office buildings, shopping and service establishments, schools, churches, public utility lines and transportation facilities, new government data show.

Dismal note in the report is expenditures for private industrial plants which continued a slow decline, dipping to 14 pct below last year's levels. Farm construction, mainly because of slow activity in expenditures for conservation and development work, and hospital building continued at levels below those of recent years.

Steel:

See 200 million ton steel consumption within 25 years.

Within the next 25 years, U. S. steel consumption may hit 200 million tons per year. That's the view of Joseph L. Block, president, Inland Steel Co.



J. L. Block, president, Inland Steel Co.

At a meeting of the Indiana Manufacturers Assn. in French Lick, Ind., last week, Mr. Block said current field capacity of 124 million tons

is obviously more than enough to meet current demand since the industry is operating at only 70 pct of capacity. But he predicted this capacity will not suffice for many years.

Hitting at the general public's view that the steel industry is an enormous profit-maker, the Inland Steel head stated that although 1953 was the biggest year in the industry's history, steel nevertheless ranked twentieth on the list of U. S. industries in percentage of earnings on invested capital. And this was its best rating in many years.

In the first quarter industry earnings dropped 18 pct compared with last year, while total for all industries amounted to a 7 pct increase, Mr. Block stated.

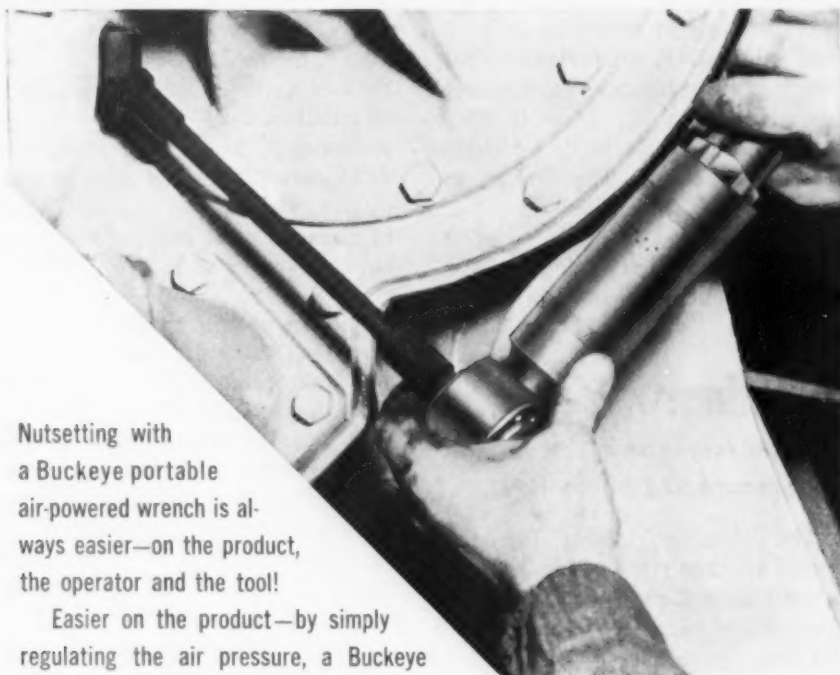
He added that steel prices have advanced only 88 pct since 1940 as compared with 116 pct for wholesale prices in general. Average hourly wages for steelworkers during the same period have gone up 159 pct as contrasted with a 92 pct rise in the cost of living.

Mallory-Sharon Gets Writeoff

ODM reports Mallory-Sharon is getting its writeoff certificate to build furnaces and buy electrical equipment for use in melting titanium and casting ingots. Company expects "considerable" increase in ingot production as a result. Work is to begin immediately.

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Expansion

Capital Goods:

See third quarter plant spending equal to second quarter.

Industry investment in materials handling equipment, motor vehicles, and related items will probably amount to about \$360 million for the third quarter forecasts U. S. Commerce Dept. and Securities and Exchange Commission.

This outlay would be some \$34 million less than is being spent in the current quarter, according to preliminary estimates, but well ahead of the \$275 million for July-September, 1953.

Total business outlays for plant and equipment are expected to be about equal in this quarter and the next. Investments are running at an adjusted annual rate of \$26.9 billion now and will be at a \$26.8 billion rate in the next 3 months.

In the January-March quarter, the spending rate was \$27.5 billion.

Plan 7 Pct Less Spending

Manufacturing firms now are spending about \$3 billion for plant and equipment, after recording outlays of \$2.6 billion in the first quarter. In the third quarter, this figure probably will drop below \$2.8 billion.

For the first 9 months of this year, manufacturers' planned investment is about 7 pct less than expenditures during the corresponding period of 1953. Durable goods industries, however, are revealing less of a drop in investments than federal officials predicted earlier this year.

In this category, primary iron and steel producers, after spending some \$210 million in the first quarter, have advanced that figure to \$252 million at present. Next quarter's outlays will be about \$240 million, the government predicts.

Primary nonferrous producers show actual and planned expenditures of \$77 million, \$87 million, and \$78 million, respectively, for the first three quarters.

Investment by mining companies is high, at \$262 million for the current period. A slight drop to \$252 million is expected in the coming quarter.

TIME STUDY: Aids in Competition

Job standardization gains favor in industry . . . Unions generally opposed . . . Many get 25 pct productivity boost with incentives . . . Systems compared—By K. W. Bennett.

Work measurement. The phrase has been seen with increasing frequency on convention and conference programs for the past year. And it's generally been accompanied by hot verbal exchanges. But many firms now regard work measurement and job standardization as strong weapons in the stiff competitive infighting now prevalent.

List of industries using work measurement is long—and getting longer. But many believe it's impossible or impractical to apply standard work formulas to job shops or indirect labor. Yet systems have been applied to stenography, plant maintenance, pipefitting and other similar jobs.

Use Many Techniques

How do you measure the time it takes an assembly line worker to insert a bolt, tighten a nut on it, move the assembly down the line and position a new unbolted part for the repeat?

A time-and-motion study would follow the process, step by step, with a stop watch.

A Work Factor Company or engineer would break the operation down into basic motions as well, but Methods-Time Measurement would check these against a standard chart to arrive at a standard time for the operation.

At least 11 such techniques are available as well as texts giving standard data charts for particular operations.

Checks Other Variables

Locality factors are also considered. MTM drill press data, for instance, was checked in actual practice at 25 companies after its original development. It's reported that some 500,000 time studies and 2 billion manhours went into the compilation of the full set of Work Factor charts.

The time-chart user would probably produce his standard rate in a fraction of the time a stop watch user would require. By this method, a study of fire brick installation in a steel mill ladle required only 2 days. Simpler operations have been evaluated in half an hour.

Establishing average output on a new job with a stop watch can be lengthy. But it permits checking such variations as machine feed when new machining stock is used, or preheat time on a furnace, or immersion periods in batch quenching.

Advocates of the stop watch system argue that newer methods apply only to actual manual motions and don't account for rate variations in plant equipment. One industrial engineer with 15 years experience in work measurement states that both methods must be used.

Movies Gain Advocates

Where a continuous operation is being studied, a comparatively recent practice is work sampling. The time-study worker checks the operation only at intervals. He checks the time needed to screw a bolt on, leaves, later returns and checks the time required to slide



"Fastest man we've got on piece work!"

that finished part out of the way. The system has been found accurate by its exponents, and allows the plant time-study man to keep a number of jobs going simultaneously.

One tool gaining favor is the motion picture camera. This reveals every move of a machine operator and, by counting the frames, the work measurement student can figure the time for each motion down to a fraction of a second.

Since costs of such studies aren't falling, small plant owners want to know if calling in a consultant or training a plant employee is a guaranteed investment. One case history presented before the Electroplaters Institute showed a 45 pct increase in production from one line. An engineer with a consulting firm counts on a 10 to 25 pct productivity boost after adoption of work standards. A legal consultant drawing up union contracts reports 25 pct increases where incentives based on work standards are employed.

Labor Fears Errors

Work measurement engineers carefully point out they aren't peddling a panacea—but they're pretty confident they have a fine tonic.

Will unions buy work measurement and standards? Though several union statements showing some enthusiasm have been published, this is not the rule. As one consultant put it, "Eighty pct of my job is selling employees on work measurement and work standards. The other 20 pct is plain horse sense applied to production."

Said a labor figure recently, "... the time study observer necessarily modifies the results of his stop-watch timing by using as a factor his opinion of the effective speed of the operator being timed—if the time study man is 10 pct off, the production standard will be 10 pct off, and—under a wage incentive system, the worker's earnings will be off 10 pct."

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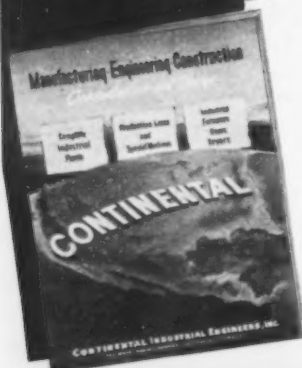
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Management

who agree. Standardized data, like MTM, are a partial answer. Careful use of a stop watch over considerably longer periods of time might be another.

Clients Like Method

A legal consultant who draws up at least 200 union contracts per year admits that well under 5 pct are based on MTM data, but has this to say. "We believe that a worker will produce 25 pct more under an incentive system. If we set up our contract on this basis, and cover 18 pct of his output with incentive pay, he finds that he'll make more money under a work standards system.

"Additionally, we've covered him with an additional 7 pct potential output that is safety insurance. The normal worker will make not only the 18 pct, but 7 pct on top of that. The proof of the pudding is in the eating. Our clients like the system. "We've had no kickbacks."

Small Firms:

Prices, salesmanship, tax relief biggest problems.

Consumers are becoming more and more price conscious, often putting price ahead of quality, small business firms are telling Small Business Administration.

Salesmanship is the biggest problem of retail outlets, with consumer credit and increasing competition also causing some headaches. Manufacturers, however, say their biggest problem is financing.

The facts were turned up in a survey of 355 small firms.

Selling techniques have failed to keep pace with the general business increase; many employees do not make a sufficient effort to maintain company good will, and salesmen need more training and supervision, businessmen told the agency.

Meanwhile, further tax relief is the most pressing need of small business, the House Committee on Small Business asserts in a progress report. Small business cannot prosper without a reduction in both personal and corporate tax rates and in some excise taxes.

Coffee:

White House blend brews profits, saves manhours.

"It's the same blend served in the White House, it's only 6¢ per cup, and besides, it's served right in the plant in which you work."

With this triple-pronged sales attack, two Chicago veterans have built up an industrial hot coffee business that has been growing steadily hotter and in gallonage since 1948. Metropolitan Coffee Service offers hot coffee in 2 or 5 gal vacuum containers, sugar and cream, rolls if desired.

Pouring 880 gals per day for 139 accounts, Metropolitan caters to a customer list that ranges from banks and insurance companies to tool and die jobbers. For the record, the advertising and commercial art group likes theirs black and in quantity, the plant worker likes sugar and plenty of rolls.

Company Pays Java Tab

The strong selling point, that employees needn't leave the plant or office for a trip to a nearby coffeeshop, has been borne out by personnel studies by customers. Manhour savings have been sufficient to encourage several customers to bear the entire cost of the service.

Though meals delivered to plants by caterers are big business in the Chicago area, Metropolitan feels it has the hot coffee field unchallenged. Only competition is coin operated coffee vending machines, and Metropolitan feels their home-brewed variety is superior.

The manhour saving to clients is substantial. Enough so to bring Metropolitan from 43 customers in 1948 to the current 139, from one large but overage coffee pot operated by its two owners to a fleet of 4 trucks, 3 giant stainless steel coffee makers, and 11 additional employees. And the future looks good.

Metropolitan's forecast for '54—another stirring year.

SAE: Report Auto Turbine Progress

Not even listed a year ago, gas turbines and air conditioning got top billing at SAE meeting . . . See 10 pct of all cars air conditioned soon—By W. G. Patton.

Two subjects that were not even included on the automobile hit parade list a year ago earned top billing at the annual meeting of the Society of Automotive Engineers summer meeting at Atlantic City, June 6-11.

Twelve months ago auto producers pointedly avoided public discussion of gas turbine power plants. This year a trio of General Motors top research engineers described in detail the broad GM research program on gas turbines including a passenger bus and the well-known XP-21 Firebird.

Interest of automobile engineers in air conditioning of passenger cars is surprising. The prediction was made at Atlantic City that within a few years at least 10 pct of all passenger cars will be equipped with air conditioning. Interest in air conditioning in the South and Southwest is booming, engineers disclosed here. Another surprising market is air conditioned cars for salesmen who drive extensively and want always to make a favorable impression on the customer.

Other topics that attracted extensive interest this year were automatic transmissions for trucks, new crank-case oils designed particularly for use in high compression engines and preignition in piston engines.

Parallels Other Projects

To understand fully the significance of the GM report on gas turbines it is helpful to go back to two earlier General Motors research programs. For example, development of the GM two-cycle diesel engine grew out of extensive tests on a simple, single cylinder engine. Similarly, the famed Kettering high compression piston engine was designed on the basis of studies of a single cylinder power plant.

The GM approach to gas turbines is following a similar, well-

defined, simple plan. Fuel studies have been purposely omitted from this phase of the GM program. Investigation to date has been directed at acquiring working knowledge of the behavior of metals at high temperature, exhaust temperatures, controls, noise level, bearings, high speed rotation, starting and braking. The detailed report by William A. Turunen, GM research engineer, indicates that considerable progress has been made.

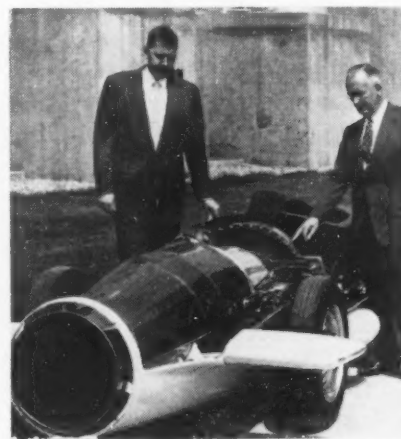
Alloy Shows Promise

Mr. Turunen's report disclosed for the first time details of a new GM Turbocruiser, a GMC transit coach in which a diesel engine has been replaced by a Whirlfire Turbo-Power unit.

The report reveals that a new high temperature alloy developed by General Motors Research, GMR-235, has shown great promise in raising turbine operating temperatures. The new nickel base alloy has performed well at 1500°F and is capable of use at a considerably higher temperature level, GM researchers stated.

Acceleration with the new gas turbine power plant is smooth.

Turn Page



GAS TURBINES in GM's Firebird and Turbocruiser bus were described by W. A. Turunen (left). GM vice-president C. L. McCuen is at right.

Research

Long life of the present power unit operating at 1500°F is indicated. An aluminum radiation shield has done an effective job of shielding the plastic body of the Firebird. Air requirements of the turbine, although 4 to 10 times as great as for a piston engine, are readily handled.

Brakes Are Unusual

Noise has not been a major problem and exhaust temperatures have been lower than was originally anticipated. With one exception, no turbine blade failure has occurred. Starting presents no special problem and the use of a transmission that permits the turbine wheel to turn backwards may solve the problem of engine breaking.

On its Firebird, contrary to current automobile practice, the brake drum and backing plate are mounted outside the wheel. The brake drum has a cast iron rubbing surface over which an aluminum drum is cast. The rear suspension uses single leaf longitudinal springs.

Most Units Differ

Probably the most surprising fact about air conditioning for autos today is that there is now so little agreement as to how or where the cooling job is to be done. Some units are mounted in the front of the car, some are carried in the luggage compartment. Some manufacturers, Nash for example, pull the air in the front of the car while other engineers insist cooled air should be brought into the back of the car or overhead.

Similarly, there is no agreement as to the amount of cooling that is necessary. This accounts in part for the wide range in the price of the various air conditioning installations. Until more is known of what the customer actually wants, air conditioning units for passenger cars are apt to be high in price. Nash is the only producer up to this time to combine heating and cooling in a single package unit. There were no indications at Atlantic City that others are planning a single unit for heating and cooling the car.

Defense

A4D—It's a Midget With Muscles



Power is wrapped up in a small package in the new Navy carrier-based atom bomber, the A4D Skyhawk.

Designed and built by Douglas Aircraft Co., El Segundo, Calif., this single-place plane is so small that it is constructed without the folding wings traditional in carrier-based aircraft. Yet it will carry A-bombs or rockets, machine guns, missiles, or other weapons.

The Navy expects its bantam bomber to out-perform many operational jet fighters more than twice its size. Powered by a turbojet engine, it will have a combat radius greater than that of present propeller-driven attack planes and is designed to fly faster over greater distances than any other attack bomber.

The A4D, of aluminum alloy construction, was built in 18 months from the time design work started. Deliveries to fleet squadrons are scheduled to start about June of next year.

Turbines:

Work on turbine power plant for U. S. Liberty ship.

Eleven private companies have submitted 17 proposals to the Maritime Administration for developing a new gas turbine propulsion power plant for experimental installation in a reserve fleet Liberty ship.

All of the proposals involve new power techniques not before used in American ships. Two of the proposals would use devices of French manufacture and another components of Swiss origin. Maritime

Administrator Louis S. Rothschild will announce the plan that is finally selected for the test.

Companies who developed the proposals at their own expense were: Westinghouse Electric Corp., Lester, Pa.; Nordberg Manufacturing Co., Milwaukee, Wis.; Cooper Bessemer Corp., Mt. Vernon, Ohio; Clark Bros. Co., Olean, N. Y.; Baldwin-Lima-Hamilton Corp., Hamilton, Ohio; Frederick Flader, Inc., North Tonawanda, N. Y.; General Motors Corp., Cleveland Diesel Engineering Div.; General Electric; Elliott Co., Jeanette, Pa.; Packard Motor Co., Detroit, Mich.; Mercier Development, Inc., New York, N. Y.

REPORT TO MANAGEMENT..

The cut that was never made

Even the most pessimistic economists are beginning to admit that the inventory adjustment is on its last legs. Now that it's just about over, it may be remembered as the inventory cutback that was never made.

Last October inventories hit their high of \$82.3 billion. After many months of determined order paring and production slowdowns, inventories in April, according to Commerce Dept.'s preliminary estimate, are still at a substantial \$80.4 billion.

This is a drop of a scant 2.3 pct, and the April '54 figure is still \$400 million above same month last year.

Does this mean we're still in trouble?

The answer is definitely--No.

How did we do it?

Reason we've been able to go through a period of sharp order and production cutbacks without reducing inventories appreciably is this: we had been buying for inventory at an exceptionally high rate, now we're reducing stocks at a moderate rate. This change from buying for inventory to cutting orders to reduce stocks hasn't slimmed the overall inventory level markedly, but it has meant a tremendous drop in volume of orders placed.

During second quarter of 1953 the U. S. was adding to its inventories at a rate of \$6.3 billion per year. In the third quarter inventory accumulation slowed to a \$3.1 billion annual rate, and by fourth quarter we had reversed direction and were reducing inventories \$3 billion per year. Order slashing was stepped up even more during the first quarter of this year with inventories being cut at a \$4.8 billion per year rate.

Buying down \$11.1 billion

This means that between last spring when we were piling up inventories at a \$6.3 billion per year rate, and the end of the first quarter, when they were being reduced \$4.8 billion per year, there has been a meat cleaver cut of \$11.1 billion in the inventory buying rate.

Despite this the recession has been mild; we're still headed for the second best business year we've ever known. That's convincing proof of the economy's overall strength.

Why it may be worse for you

Has the recession clobbered your firm harder than you expected? A check of your advertising budget may tell why. If it's down from last year, that may be your mistake. It's a good bet your competition didn't trim its ad outlay.

Used to be that when business got tight, the first move a firm made was to slice its advertising. Witness all the out-of-work copywriters in the Thirties. But now most firms regard a business slump as the time to increase their sales efforts.

Survey by Printer's Ink indicates national advertising during the first quarter was 13 pct ahead of same period '53. Only medium showing a decrease was network radio, down 3 pct.

June 17, 1954

Industrial Briefs

Congrats . . . Allmetal Screw Products Co., Inc., Garden City, N. Y., celebrated its 25th anniversary and completion of its Garden City plant at a series of open house parties last month.

New Moniker . . . ACF Industries, Inc. is the new corporate name of the American Car & Foundry Co.

Formally Opened . . . The new Kansas City Pump Works of Fairbanks, Morse & Co. was formally dedicated and opened to the public last month. The new plant is geared to an annual output of enough pumps to move 35 billion gal of water or other fluids per day.

Completed . . . Allegheny Ludlum Steel Corp. has completed an expansion and improvement program at its Carmet Div. plant in Ferndale, a Detroit suburb. The new facilities make the company an integrated prime producer of cemented carbides for tool and die applications.

Announcement . . . General Electric Co., Schenectady, will begin construction of a new \$5 million plant at Shelbyville, Ind., for the manufacture of industrial furnaces, induction heating equipment, and heating devices.

Now Operating . . . Rockwell Mfg. Co.'s new 116,000 sq ft completely air conditioned manufacturing plant at Sulphur Springs, Tex., has started production operations.

Expanded . . . Continental Can Co.'s Houston plant has completed expansion and modernization of a new warehouse with storage space for more than 17 million tin cans.

Purchased . . . Gramer Transformer Corp., Chicago, has purchased the Halldorson Transformer Co., 4500 North Ravenswood, Chicago.

Grand Opening . . . Bedford Foundry & Machine Co., Bedford, Ind., has opened a new sales office in Pittsburgh at the Oliver Bldg., Room 1241. Wallace MacDonald will be in charge.

Featured . . . William R. Hewlett, president of the Institute of Radio Engineers, will be the featured speaker at the Annual All-Industry Luncheon, held during the 1954 Western Electronic Show and Convention in Los Angeles, Aug. 25-27.

New Arm . . . Kaiser Aluminum & Chemical Sales, Inc. has appointed Miratile Manufacturing Co., Inc., Chicago, as a specialized distributor to service the Midwest's house-trailer manufacturing industry.

Contract . . . Long Mfg. Co. Ltd., Canadian subsidiary of Borg-Warner Corp., Chicago, has awarded a contract for the erection of a new plant at Oakville, Ont. for the manufacture of automotive radiators.

Moving Day . . . U. S. Steel Supply Div. of U. S. Steel Corp. is moving its Reinforcing Bar Div. to 42-44 Lister



NEW Deputy Assistant Defense Secretary for Logistics is R. C. Lanphier, Jr. Before joining the Defense Dept., Mr. Lanphier was a director of Sangamo Electric Co., Springfield, Ill.

Ave., Newark, N. J., from its present warehouse in that city.

Join Forces . . . Hanson-Van Winkle-Munning Co., Matawan, N. J., and J. C. Miller Co., Grand Rapids, Mich., have entered into a formal agreement. Contract provides for the consolidation of the organizations and operations of both companies by the transfer of the physical assets, good will and organization of the J. C. Miller Co. to Hanson-Van Winkle-Munning Co.

Expected . . . More than 500 mid-western management and production leaders are expected to attend the ninth annual National Metal Trades Assn.'s Plant Management Conference at French Lick, Ind., June 20-23.

Change Made . . . Enthone, Inc., New Haven, Conn., has changed the name of one of its standard products. "Enthol" is the new name of the product formerly sold as Enthone Compound 42.

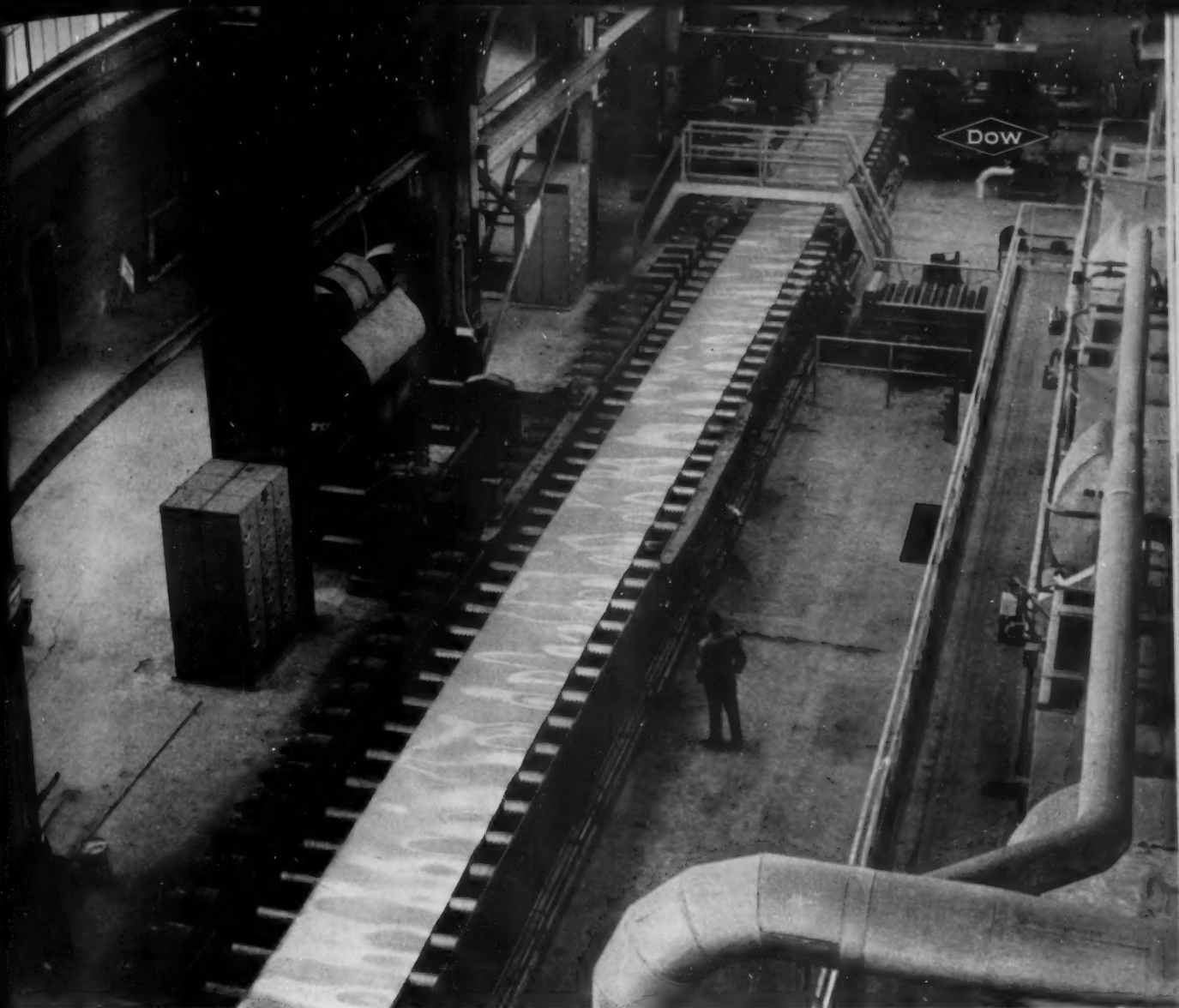
Stock Record . . . Westinghouse Electric Corp. has a record total of 23,379 employees that have authorized payroll deductions of \$5,105,666 for the purchase of the company's common stock during the 6-month buying period that started May 1.

Electro
MANGANESE
99.9+%

STANDARD
OF THE
WORLD
FOR
PURITY

Write for
pamphlet

Electro
MANGANESE
CORPORATION
BOX 479 KNOXVILLE, TENNESSEE



World's First 84" Magnesium Coil Mill.

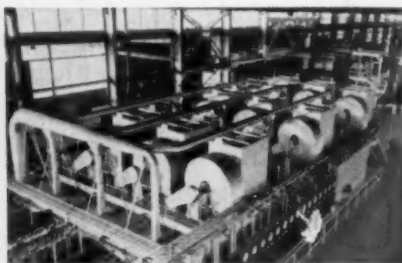
a new look at Magnesium!

**UP TO 25%
PRICE REDUCTION
IN SHEET AND PLATE**

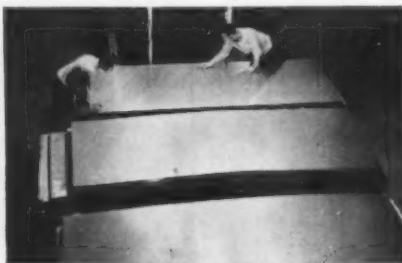
New Dow facilities—now in operation—are producing magnesium sheet in quantity. Wider, longer—magnesium sheet now offers a brand new challenge to designers, engineers, manufacturers. To cut costs, to save weight, to add strength—to do revolutionary new things for many products—get the new magnesium story! Call the nearest Dow sales office or write THE DOW CHEMICAL COMPANY, Magnesium Department, Midland, Michigan.



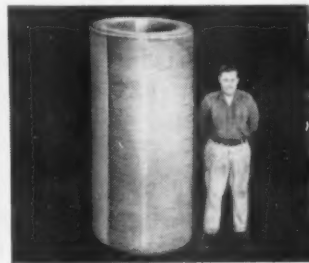
For the first time, large magnesium rolling ingots weighing nearly a ton are being rolled.



Specially designed, carefully controlled ovens pre-heat huge magnesium ingots just before rolling.



Constant inspection plus rigid production controls assure uniform magnesium sheet quality.



Note how coil of magnesium sheet illustrates new availability in greater widths and lengths.

you can depend on DOW MAGNESIUM



The Automotive Assembly Line

Power Steering Here To Stay

Luxury item 3 years ago . . . Today it's standard on many cars . . . Install 1 million plus units in '54 . . . Makers are prepared for universal usage—By R. D. Raddant.

Power steering has apparently come of age in the 3 short years since it was introduced in 1951 as another device to make driving safer and easier. Since then it has grown in use at a rate that far surpassed acceptance of the automatic transmission and has left supply lagging far behind demand.

Full importance of appliances in the industry is often underestimated by outsiders. It is recalled how the fire at the Detroit Transmission plant last year temporarily immobilized three of GM's own divisions, independents and others it supplied with Hydramatics.

A similarly major disaster to power steering wouldn't have the same total effect, but there is substantial evidence that it can no longer be considered just an expensive (\$135 to \$170) driving aid. In most luxury lines, power steering is now standard equipment. It made inroads into the medium priced bracket in 1953 and invaded the low priced and truck field with amazing success this year.

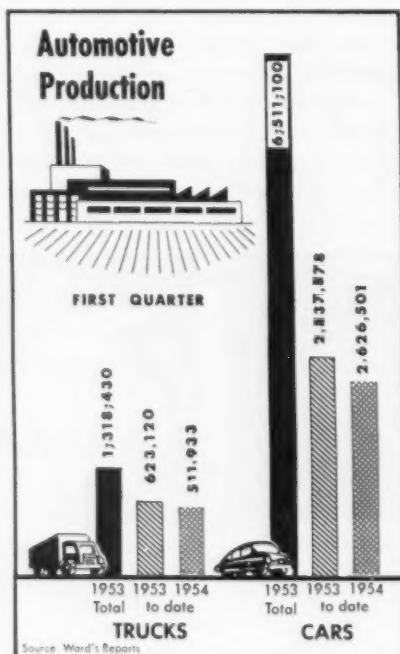
Equip 1 Million Cars . . . About 22 to 23 pct of General Motors cars will be supplied with power steering this year, a percentage probably representative of the industry. At that rate more than 1 million cars built this year will have the device.

Chrysler first introduced its full-time version of power steering in 1951 and was followed a year later by the GM unit produced at its Saginaw Steering Gear Div. Then Bendix, Monroe Auto Equipment Co. and others offered units to Ford and inde-

pendents. Saginaw Steering supplies Hudson, Lincoln and Studebaker.

The fact that power steering is working its way into the standard equipment category is indicated by several things: Auto companies have spent millions in plants and tooling for a vastly expanded future market. Design of the modern car almost demands steering aid. Long-range forecasting indicates that a central electro-hydraulic power unit to power all accessories is definitely in the works, a development that would make power steering itself an inexpensive part of an accessory system.

Weight Poses Problems . . . Increased weight, particularly on the front wheels, a larger tire section, smaller tire diameter, and lower air pressures have combined to make parking or turning at low speeds a real chore.



A 1929 Chevrolet required only a simple worm and sector gear to turn its wheels at a steering gear ratio of only 9.5 : 1. As cars grew heavier, more complex gearing systems became necessary and ratios gained until a Cadillac in 1951, before power steering, had a ratio of 21.3 : 1.

All power steering systems are not alike. Some use the hydraulic booster system, others a linkage booster system. Chrysler has full-time power steering while GM's needs a pull of slightly over 3 lb on the steering wheel before the power system goes to work.

Rush New Facilities . . . Nothing shows the industry's confidence in power steering's potential better than the facilities built and engineered for its manufacture. Saginaw's Buena Vista plant, rushed to completion in under 2 years, shows what GM has in mind. The millionth unit was turned out in April of this year, but capacity will soon be over 1 million a year.

Manufacture of the important pump unit alone shows a degree of automatic handling that rivals anything in the industry. A power and free conveyor system is employed, one of the few used anywhere in industry for small units, but usually associated with engine assembly in highly automated engine plants.

This system transports parts in 440 carriers over a total of 2284 ft of power-free track and 1992 ft of power track, through 135 switches into 40 drop or loft sections. Along its length it swings into an electrostatic paint booth where paint charged with 40,000 v is sprayed on the pumps.

Fit Future Plans . . . The pump section, incidentally, could very easily be adapted to any small hydraulic unit, including the central unit for the entire accessory system as mentioned previously.

Turn Page

What's in the wind for power steering in the next few years? Probably most attention will be given to improving present units, reducing space requirements such as in Chrysler's "coaxial" unit mounted on the steering column, and improving manufacturing facilities.

It will probably not be standard equipment in the moderate priced cars until some years hence when it is tied in with a central power system.

Clean, Salvage Chips . . . Incidentally, chip handling and coolant salvage at the new Buena Vista plant of Saginaw Steering has the appearance of a modern laundry.

Chips from the automatic screw machine battery are conveyed automatically to a crusher, then dumped into large units that look a lot like an automatic washer. They are whirled at high speed and the coolant and oil are expelled by centrifugal force, leaving the chips dry and clean.

The chips are so dry that they are actually blown in huge ducts from the dryer area into railroad cars at the siding.

Styling:

Olds' 2-tone paint job a sleeper success.

About once each model year some automaker will come up with a single, simple device of design, styling, or trim that will set his particular car a trifle ahead of the rest. Sometimes it's even a surprise to the manufacturer.

This year credit goes to Oldsmobile for the sweeping, V-shaped, 2-tone treatment of the Starfire convertible and Fiesta coupe. Actually, there is nothing surprising about it. It evolved from the trim and paint job done on last year's Fiesta.

However, in all auto shows its applause was usually outstanding and Oldsmobile salesmen credit it with the higher than an-

ticipated sale of the Fiesta and Starfire this year.

The reception must have caught advertising copywriters by surprise too. The treatment has no special name, but is just called the special 2-tone paint job or sweeping V.

The effect was developed in cooperation between body engineers and the Olds section of GM's styling division. There are now 13 color combinations available.

Wheelmaker Switches to Welding

Following five years of development and retooling that cost about \$1 million, Motor Wheel Corp. completed a changeover of methods to produce all passenger car wheels by the "electrofuse" welded wheel process.

This process, first reported in this column (THE IRON AGE, June 18, 1953, p. 108), replaced the traditional method of riveting the stamped center section to the rim. Advantages are that the welded wheel is stronger and the job is done by automatic welding

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
June 12, 1954..	119,343*	21,061*
June 5, 1954..	102,077	17,611
June 13, 1953..	146,408	20,687
June 6, 1953..	117,411	17,468

*Estimated. Source: Ward's Reports

machines in one operation, replacing the many operations of riveting.

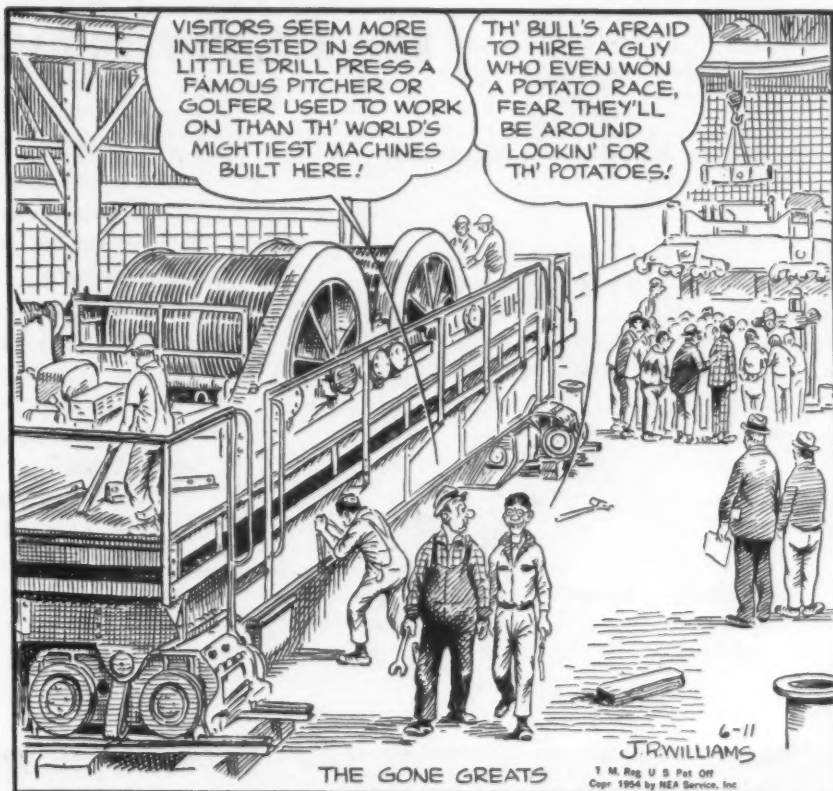
Fluorine Kind to Radiators

Don't worry about your car radiator if you live in a city or hamlet that is experimenting with fluorine-treated water as a tooth decay prevention measure.

A. M. Wauters, chief research engineer for Ford Engineering Staff, reports that tests indicate it is harmless to radiators. Ford engineers reported that solutions 4000 times stronger than those in water systems showed no pitting or corrosion after extensive tests. He didn't say if it might prevent radiator decay too.

THE BULL OF THE WOODS

By J. R. Williams





new **flamatic** uses drew record crowds

high heating capacity

electronic control

versatile, low cost tooling

at ASTE Show. They saw six transmission shafts hardened at one time with varying depths of hardness over the length of shaft . . . automatic brazing with the first application of electronic temperature control . . . high speed selective hardening of crane hook rollers.

Flamatic electronic control puts selective heating on a scientific basis: gives you controlled hardening or brazing results on a wide range of parts. This, plus Flamatic's long background and experience in tooling, assures you the best combination of high speed automatic processing with low initial investment.

Whatever parts or products you are now hardening or brazing, you'll do well to check Flamatic. Write for new booklet, Publication No. M-1853, featuring proven Flamatic applications.

flamatic

PROCESS MACHINERY DIVISION

THE CINCINNATI MILLING MACHINE

Cincinnati 9, Ohio, U. S. A. •



This Week in Washington

Threat of Controls Return Fades

U. S. refusal to go it alone in Indochina cuts odds on early return to controls . . . Still map emergency measures . . . May boost military orders—By G. H. Baker.

Threat of price and wage controls has been reduced almost to zero by the turn of recent events at the Capitol. What really let the steam out of the swelling balloon of war talk was the flat U. S. refusal to be drawn alone into the Indochina war.

Result is a slower pace of activity at the Office of Defense Mobilization among officials concerned with drafting the control laws for any future period of all-out mobilization.

Talks between government and industry experts over the form and shape of business rules of the future are going ahead on schedule, but the hot-eyed urgency that electrified all such meetings until recently is gone.

Things began to move at a much slower pace last week after President Eisenhower cleared the air with the statement that he did not intend at this time to ask Congress for authority to intervene in Indochina.

May Boost Orders . . . There's to be no let-down in the tempo of business as a result of this non-intervention policy, however. Business inventories generally have been melting away faster in recent weeks than at any time since the Truman Administration held office, and the military is talking more and more about increasing its orders in the hard-goods lines—particularly for planes and ammunition and the many components that fall into these two broad categories.

Both of these developments point to a pick-up in the placing of factory orders in the weeks ahead. By Labor Day, the way the economists figure it, the upturn

will have been translated into terms of bigger payrolls and higher consumer spending.

Need Census Funds . . . Better measurement of business growth may not be voted by Congress this year. Economy-minded legislators are talking of sidetracking a White House bid for about \$8.5 million for taking the long-postponed business census next year.

Both the Senate and the House have voted authorization for the business censuses in 1955, but have voted no funds for the purpose. Of the requested \$8.5 million, about \$3.8 million would be earmarked for the taking of the census of manufactures. But un-

How to Mop Up After A-Bomb

How to safeguard company records, prepare for emergency shutdowns and insure continuity of management in the event of atomic attack are among suggestions contained in a new industrial defense planning manual soon to be distributed to iron, steel and allied industries by the Business and Defense Services Administration.

The manual, prepared by an eight-man committee of steel industry officials, is being printed now and will be distributed through the Iron and Steel Div. of BDSA.

Also covered in the manual are tips on financial aid to employees, feeding and housing disaster victims, emergency communications equipment, disaster training programs, emergency casualty stations, equipment and inventory rehabilitation, emergency transportation, secondary water supplies, emergency light and power, and subcontractors facilities.

less the money bill wins Senate and House approval, the authorization vote counts as only "paper" approval.

Senator Carlson, R., Kan., reminds his colleagues that the business censuses are especially valuable to smaller firms that can't afford to maintain their own statistical departments. And the data helps government plot anti-depression measures well in advance of the danger periods, he points out.

Must Up Shipbuilding . . . Keeping the U. S. merchant marine at a healthy level means construction of 60 new ships annually, plus incentives to shipowners to replace old ships at a faster rate. This is the meat of the new Maritime Administration recommendations to Congress on what's wrong with the U. S. shipbuilding industry and what should be done to get it back on its feet.

U. S. shipyards could easily turn out 60 new vessels annually. This rate of output would mean that 36,000 shipyard workers would be kept busy. Last year, shipyard payrolls carried 23,000 workers. This year, only 10,800 are employed. Next year's total will fall off to an uncomfortable 1200 workers, unless something is done to reverse the trend.

Ask Road Funds . . . Highway programs of future years may be affected to a marked degree by two proposals before Congress. One of these deals with the question of funds for highway research; the second concerns buying of right-of-way tracts.

The first bill would pin down clearly the amount of research money to be made available to U. S. Commerce Dept. from the new federal-aid authorization provided in Public Law 350, 83rd Congress. A section of this law gives the Secretary of Commerce the task of studying in very broad terms all aspects of highway



TITANIUM RINGS?

... sure we make them

In 1950 American Welding completed the first successful production flash butt-welding of the new wonder metal — Titanium Alloy. Since that time hundreds of Titanium components have been produced in our plant.

If you use, or are planning to use, fabricated Titanium components, let our Product

Development Division study your problem: Our factory is equipped to perform welding, machining, and fabricating of all types of ferrous and non-ferrous metals.

Call or write us today!

THE AMERICAN WELDING & MANUFACTURING COMPANY

120 DIETZ ROAD
WARREN • OHIO

THE IRON AGE

building and rebuilding, improvement, maintenance, safety, and related matters.

First, however, legislative action assigning funds for the study would be needed.

In a second measure, Congress will be asked to authorize money for the states to use in purchasing right-of-way property. These tracts would not be bought on a "crash" basis which would tend to drive real estate prices sky-high, and they might remain uncleared for 5 years or so before any actual highway work was started.

Plan Surplus Sales . . . Advice on efficient disposal of military surplus materials will be provided by a committee of nine businessmen, meeting with federal officials for the first time on June 21.

Committeemen will help the Defense Dept. set up plans for getting the maximum return for surplus items while minimizing adverse effects on private suppliers of materials.

Members of the group have had long service with production and merchandising concerns.

Trade:

Battle on trade-tariff plan, delayed not ducked.

Showdown between opposing factions in current tariff-trade controversy has been put off until next year, not averted.

President Eisenhower backed away from a test of strength over his eased trade-tariff program at this session to consolidate his forces for a new assault next year.

One-year extension of old Reciprocal Trade Act solves nothing by retaining status quo. It won't satisfy Mr. Eisenhower and Foreign Operations Administrator Harold Stassen because most of the tariff-cutting powers it originally contained are already used up.

And Mr. Eisenhower won't agree to give up whatever powers to negotiate new trade agreements

remain in the law, demanded by some congressional leaders as the price of a compromise.

The administration is operating on the theory that increased flow of trade is necessary to stem the tide of Communist economic and military aggression. Opponents argue that low tariffs hurt domestic business, produce unemployment.

Some Democratic leaders on Capitol Hill are threatening to tie to another major law the President's request for a 3-year trade act giving him power to reduce selected unspecified tariffs 5 percent each year, thereby forcing the showdown.

Real test will probably come next winter when House Ways and Means committee begins hearings.

Investment:

U. S. insures transfer of foreign earnings to dollars.

Military and economic advantages will accrue, the Foreign Operations Administration predicts, from its recent action in providing investment protection for a new European venture by Raytheon Mfg. Co., Waltham, Mass.

Raytheon is licensing a German firm, Atlas Werke, of Bremen, to produce commercial radar equipment and a device for measuring water depths electronically.

Similarly, the American company is licensing the electronics concern known as FIRAR, of

Genoa, Italy, to manufacture magnetron tubes for radar sets and klystron tubes for ultra-high-frequency communications gear.

In each case, Raytheon is being protected by the U. S. against loss from inability to transfer its earnings into dollars. This arrangement is intended to stimulate American private investment in productive facilities abroad.

FOA believes the equipment to be produced under license in Germany will be of material benefit to shipbuilding and fishing industries in that country. The agency expects tube manufacture in Italy to be militarily significant to Western European nations.

Agency also is guaranteeing convertibility of receipts from the investment in a new British subsidiary of the Cone Automatic Machine Co., Inc., Windsor, Vt., to a maximum of \$262,500—175 pct of the dollar value of the initial \$150,000 investment—for 10 years.

One-third of Cone's business is in exports of lathes and other high production machines used in ball bearing, automotive, aircraft, armament, appliance industries made through sales and service organizations maintained in England, France, Italy and Australia.

The new subsidiary will operate as an engineering and sales organization supervising contract production until its own manufacturing plant is established later.

Wilson to Supervise Seaway

Top direction of the U. S. part in development of the St. Lawrence Seaway will be in the hands of Defense Secretary Charles E. Wilson.

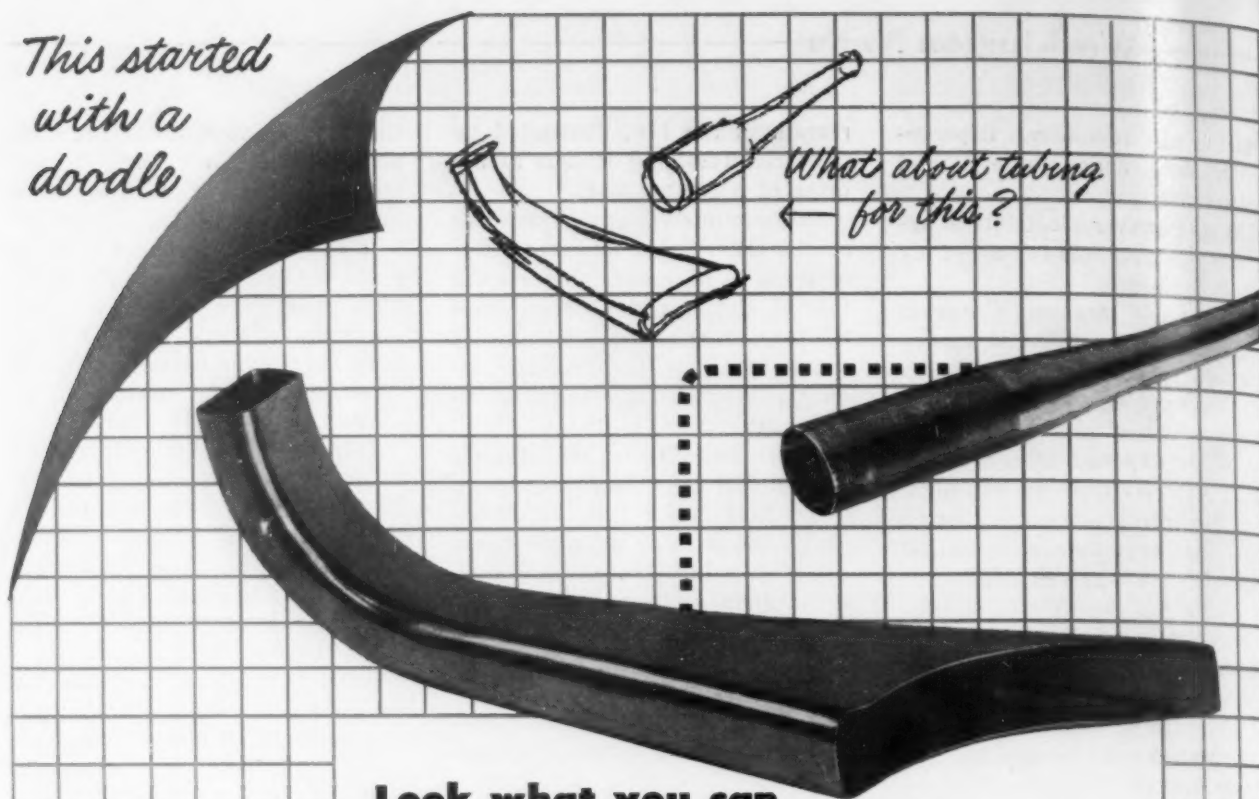
The job, assigned to Mr. Wilson by President Eisenhower last week, will not entail detailed management of the project. That task will be performed by the administrator of the St. Lawrence Seaway Development Corp., still unnamed early this week.

The executive order giving the supervisory job to Mr. Wilson was the first important White House action related to the Seaway since the project was approved in May.



"Iron Age hasn't come yet!"

*This started
with a
doodle*



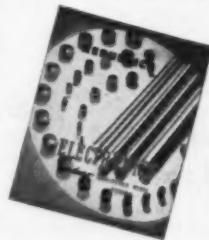
Look what you can do with Stainless Steel Tubing

Ever try to make a tapered, rectangular tube with a bend in it? That was the problem which faced Configured Tube Products Company of Chicago when an order was received for a stainless steel spout for a cream separator.

Of course, you can cut out a blank, form it, bend it and weld it. That's the hard way. Too many expensive operations.

Configured Tube Products did it by starting with a length of Republic ELECTRUNITE Stainless Steel Tubing. Using an exclusive Republic process, the round tube was configured to the tapered shape shown above. This process controls the wall thickness, keeping it uniform, and makes possible a smooth, wrinkle-free bend. The tube is shaped on special equipment, cut and polished. The result: a cream separator spout with a smooth surface free from contaminating imperfections . . . and at a reasonable production cost.

Does this give you an idea? Perhaps your product would be cheaper to produce. Or give better service. Or open up new markets if it were made from stainless steel tubing or pipe. Republic engineers will be glad to help you design with ELECTRUNITE Stainless Steel Tubing. Ask your Republic Salesman to make the arrangements.



Write for your copy of this informative booklet. It contains extensive data on how to design with ELECTRUNITE Stainless Steel Pipe and Tubing.

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Steel and Tubes Division

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Export Department: Chrysler Building, New York 17, New York

REPUBLIC
ELECTRUNITE TUBING



West Coast Report

Industry Is Busting Out All Over

Copper tonnage to jump 250,000 annually . . . May sees \$34.7 million construction increase in Los Angeles . . . Uranium mining booms anew—By T. M. Rohan.

The talk in the West last week was all expansion.

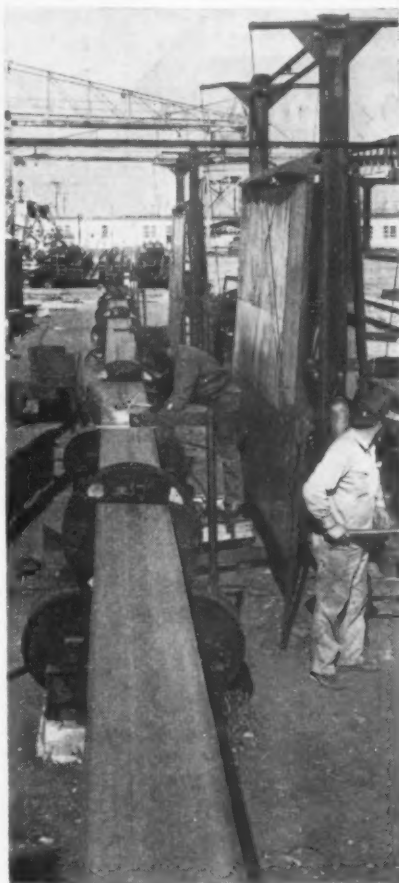
In San Francisco, a copper producer said that 12 new western projects in the industry will increase output by 250,000 tons annually. A San Francisco mining machinery firm said 20 pct of its business is now in uranium equipment for the boom in Utah and Colorado with a 10 pct increase in sight. Northern California industrial expansions and new projects hit \$49.7 million through April with new investment for April alone triple the same month in 1953. Los Angeles reported a whopping \$34.7 million increase in May alone—\$1.9 million in six new plants and \$32.7 expansion in 24 plants. Renewed interest on the part of eastern firms to establish branches in Los Angeles has become evident, the Chamber of Commerce said. Western ingot rate also rose to 84.1 pct this week from 80.7 last week.

Start Bar Mill . . . In Seattle, Frank Seidelhuber, Jr., former president of the Seidelhuber Steel Rolling Mills, announced start-up of a new small size steel merchant bar re-rolling mill. The only other similar mill in the area, Western Rolling Mills at San Jose, Calif., announced it is adding three new 8-in. stands for a total of 10 to be completed in July. In Tucson, Ariz., Hughes Aircraft this week starts work on \$1.6 million construction of 22 new buildings on 640 acres for production of guided missiles. Completion is scheduled by year's end.

Convert Unused Shapes . . . The new Seattle mill, Pacific Steel Rolling Mills, Inc., has been in

preliminary operation for about three weeks, Mr. Seidelhuber told THE IRON AGE. It has found an immediate major market in conversion work on reinforcing bars and small shapes which have been gathering dust in manufacturing inventories. Steel apparently dates to shortage days when manufacturers took what they could get. In whittling inventories they are reluctant to scrap unusable material.

The new mill features less than



ROTATING JIG facilitates welding two 60-ft H-piles for pier footings of new Richmond-San Rafael (Calif.) bridge, see page 104.

carload lot shipments with 10,000 lb minimum. Present capacity is about 400 tons monthly with expansion planned through addition of new furnace, plus an 8-in. 6-stand continuous mill, and 2-high breakdown mill. Maximum product size is 1 in.

Copper Firm Diversifies . . .

Emergence of Kennecott Copper Corp. from its copper cocoon into a half dozen other fields in a deliberate expansion and diversification policy, was described for the San Francisco Security Analysts by Treasurer E. S. Hann.

Kennecott, the free world's largest copper producer, has branched into uranium, aluminum, titanium, gold, silver, phosphates, iron and steel, Hann said. Its major interest is still copper since it turns out 25 pct of the Free World's output and 45 pct of U. S. domestic supply. He said copper firms in the West have 12 major expansions in current process with total capacity of 320,000 tons annually.

Expansions in other fields are a \$20 million investment in Kaiser Aluminum, substantial investments in two South African gold mines which make uranium as a by-product, 66 pct ownership of Quebec Iron & Titanium Corp. where a 3 ton per day titanium plant is being engineered and a 25 pct interest in Western Phosphates, Inc., of Garfield, Utah.

Push Research, Exploration . . .

In the West, Kennecott has erected a \$17 million electrolytic refinery at Garfield, Utah, and acquired the U. S. Smelting and Refinery Co. workings there; developed a new ore at the Ruth, Nev., mine and converted the Ray, Ariz., mine from underground to open pit. A \$2.5 million research lab has been started at Salt Lake City and "We also have a high powered exploration department covering practically all corners of the globe," he added.

This is the difference High Velocity Turning makes

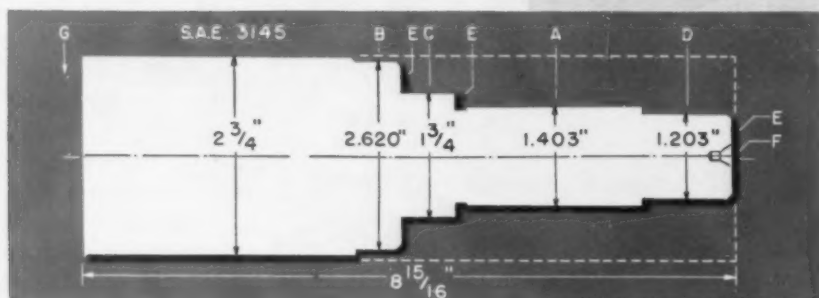


IN 1950

this job took...

12.40 min.

FLOOR TO FLOOR



- A. Turn 489 RPM — .011 feed
- B. Turn 340 RPM — .022 feed
- C. Turn 489 RPM — .011 feed
- D. Turn 489 RPM — .011 feed
- E. Face end, shoulders & neck 489 RPM — .0055 feed
Chamfer
- F. Center drill
- G. Cut off 82 RPM — .0035 feed H.S.S.



IN 1954

this same job takes...

5.40 min.

FLOOR TO FLOOR

- A. Turn 694 RPM — .022 feed
- B. Turn 694 RPM — .022 feed
- C. Turn 694 RPM — .022 feed
- D. Turn 694 RPM — .022 feed
- E. Face end, shoulders and neck — 694 RPM — .055 feed
Chamfer
- F. Center drill
- G. Cut off 489 RPM — .0025 feed

J & L TURRET LATHES GIVE...

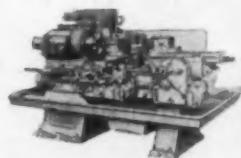
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Visitors who attend J & L's periodic "Production Studies" Seminars see this job turned out in just 5.40 min. on a Jones & Lamson #7A Universal Turret Lathe.

Only with lathes like this, built with plenty of power and the beef to back it up, can your shop take full advantage of the quality, productivity and lower costs offered by High Velocity Turning.



This job is one of the many turned at high speeds on our production line. Come to Springfield and see for yourself. At any rate, send for catalogs #101-A and #102.



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THE IRON AGE

Machine Tool High Spots

Automation Big Boost to Forming

Precision forging, hot and cold-forming methods show rapid growth . . . Getting increased attention from cost-conscious metalworkers—By E. J. Egan, Jr.

Never-ending task of the metalworking industry is to produce more and better parts at lowest unit cost in a given period of time. Manufacturers would prefer to tie up less capital in the weight of metal necessary to make a finished part. They'd also like to cut machining and finishing costs wherever possible.

Offer Possible Solution . . . Precision casting, powder metallurgy, and forging and extrusion methods have shown rapid growth, offer possible solutions to some of these cost problems. Their common purpose—to put just the right amount of metal in the right places.

Use of these methods is expected to increase because of the stepped-up trend toward automation.

Boosts Forging . . . Members of the Society of Automotive Engineers got a pep talk in Detroit recently on trends in modern forging methods. Speaker was Robert G. Friedman, vice-president and assistant general manager of the National Machinery Co., Tiffin, Ohio.

Mr. Friedman applied the term "forging" to all processes which

cause metal to flow in the solid state. He emphasized that the industry has left the "village blacksmith" far behind, that it is continually bringing out new processes, methods, tools and dies.

Cut Skilled Worker Need . . . Improvements in hot forging machinery and dies have done much to reduce need for skilled manual labor. Results are better uniformity from blank to finished part, with less flash to be trimmed away. Simple reducing roll dies now pre-form blanks rapidly and accurately, and still allow plenty of time for finish forging on the same heat.

Saves Metal . . . This method of reduction rolling was applied to tractor crankshaft forging blanks. Production was boosted substantially, while saving more than 5 lb of metal per forging.

Precision press forging installations are increasing rapidly, Mr. Friedman said. Some of these precision plants are reporting four times greater output, unit for unit, over other forging methods.

Use on Jet Blades . . . One type of jet engine blade is an example of a tough production job efficiently handled on a precision

press. The upset blank is finish forged on a 2000 ton press, bringing the airfoil section within tolerance limits with no further machining required.

Hot extrusion of automotive wheel spindles on precision presses permits a material saving of 30 pct over former drop hammer methods, Mr. Friedman stated. This saves 10 tons of steel per day at a production rate of 400 spindles per hour. The extrusion method has saved 20 machines, 4000 sq ft of floor space and 65 pct of the former labor cost.

Horizontal deep piercing of high explosive shells is accomplished in a single heat, on one machine, without intermediate annealing or coating. Forgings weigh almost 3 lb less than those made on World War II installations. The speaker explained that the secret of the process is simply a case of highly competent die engineering.

Cold Forging . . . Greatest strides toward elimination of machining are being made by automatic cold forging machines, according to Mr. Friedman. Production of many parts is being shifted from screw machines to this high speed cold forging method.

A cold nut former automatically produces nuts from coiled wire or rod at speeds up to 100 per minute. Finish, soundness and accuracy are of the best.

New Officers of the American Gear Manufacturers Assn.



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The **Iron Age**

SALUTES

Graham B. Brown

Top creative talent, energy and practical ability have brought him success in varied endeavors.



A TOP-FLIGHT design engineer or a crack administrative executive is a valuable asset in any manufacturing enterprise. When these diverse talents are combined in one person the results are bound to be gratifying. That's what Tube Reducing Corp., Wallington, N. J., found in their works manager, Graham Brown.

When Graham joined Tube Reducing 3 years ago as administrative assistant the firm was faced with the problem of developing and installing large tube-reducing machines which could extend the range of outer diameter sizes available from 6 in. to a maximum of 17 in.

Design, construction and installation of the giant tube reducers (even design of the plant to house the new machines), was wrapped up into one ball of wax and supervised by Graham.

Though he's still under 40, Graham came to Tube Reducing with a broad background of activities. After obtaining an electrical engineering degree from Ohio State and doing postgraduate work at Yale's Sheffield Scientific School, he joined Youngstown Sheet & Tube.

World War II brought him to the Naval Ordnance Laboratory in Washington as a development engineer. At the conclusion of hostilities he returned to Youngstown where he became superintendent of the Hot Mill Dept. In 1948 Graham went back into government service for 3 years, this time as Iron & Steel Advisor to the Munitions Board.

Leisure time finds Graham in his New Jersey home with Mrs. Brown and their three children. Loafing? Probably not; he'll either be designing and building his own furniture or increasing his notable amateur talent as an oil painter.

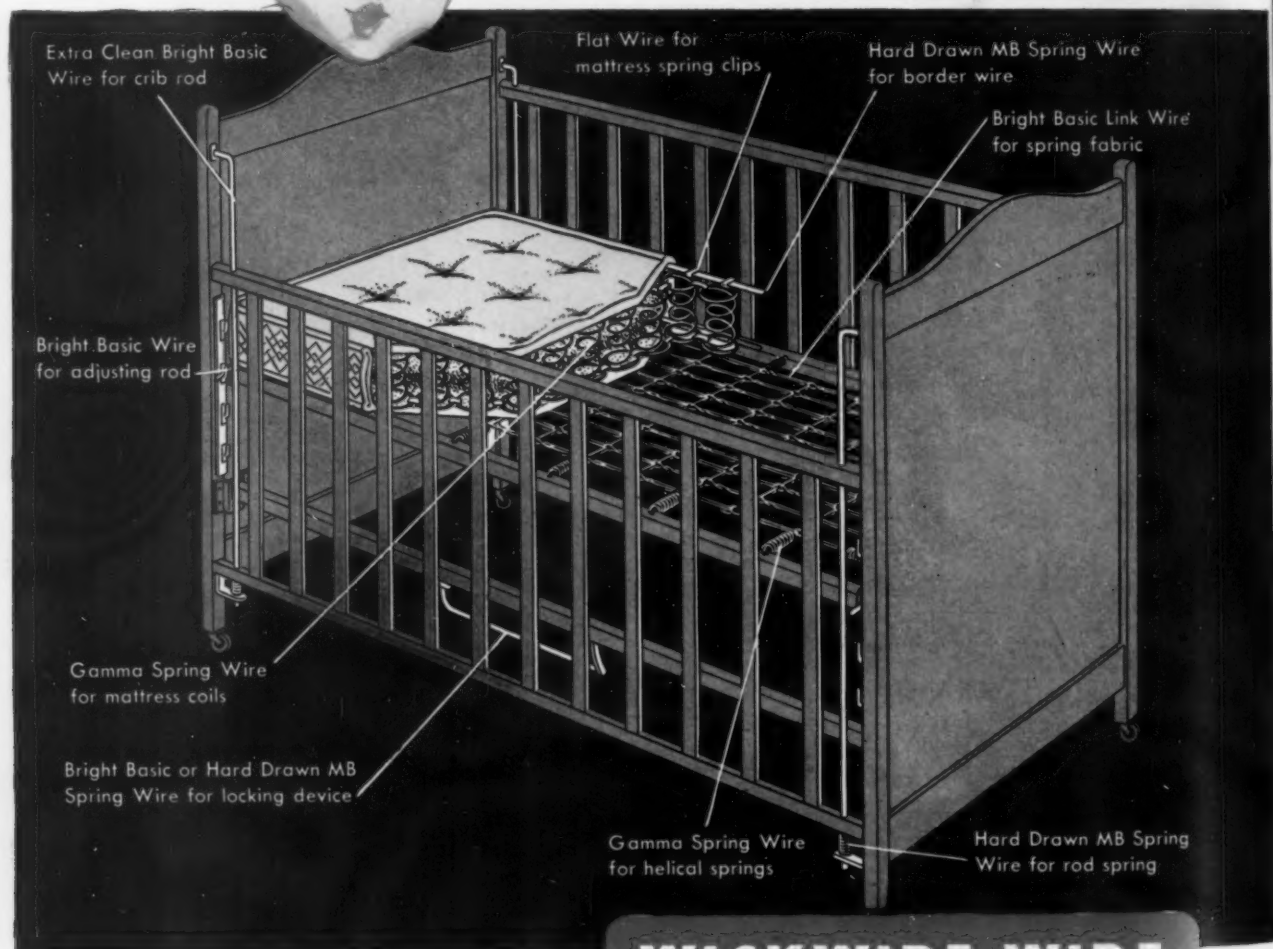


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No less than nine different kinds of wire go into the making of a typical baby's crib. And every one of them is a product of Wickwire—the result of painstaking fabrication and quality control that's complete and uninterrupted from ore to finished wire.

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PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

The Iron Age

INTRODUCES

William B. Howard, will now handle special assignments for the sales vice-president, Aluminum Co. of America, Pittsburgh; Samuel J. Simmons, Jr., named Pittsburgh district sales manager; and Edward G. Cahill, named assistant district sales manager, Cleveland district.

T. C. Gray, elected vice-president in charge of engineering, Pullman-Standard Car Mfg. Co.

Fred C. Foy, vice-president and general manager, Tar Products Div., Koppers Co., Inc., elected a member of the board of directors.

Wallace C. Johnson, vice-president-sales, has been elected to the board of directors, Admiral Corp., Chicago.

Eric W. Peterson, appointed director of manufacturing, The American Safety Razor Corp., New York.

Harry S. Brenner, appointed director of engineering, Olympic Screw & Rivet Corp., Downey, Calif.

C. J. Tuckley, named director of sales, Guibert Steel Co., David B. Hughes, named sales manager; Joseph Stevens, becomes chief designer, Design Dept., and H. E. McMinn will continue as chief engineer.

E. W. Theilig, becomes chief engineer, Power Pump Engineering Dept., Oil City Works, Worthington Corp.; and R. K. Grobholz, appointed manager, Reciprocating Pump Sales Section.

Marshal G. Staub, elected treasurer and assistant secretary, Newport Steel Corp., Newport, Ky.

Max H. Bailey, named division sales engineer, Calco Div., Armco Drainage & Metal Products, Inc., Middletown, O.; O. M. Carter, appointed state sales manager, Mississippi and Arkansas; and Crosby W. Bean, becomes division sales engineer, Southwestern Div.

Harry E. Case, appointed sales engineer, Dravo Corp., Machinery Div., Pittsburgh.

Francis W. Klotz, appointed to the Syracuse territory as a sales engineer, Standard Steel Works Div., Baldwin-Lima-Hamilton Corp.; and Philip E. Pacini, assigned to the Pittsburgh area as a sales engineer.

James H. Birnie, named chief accountant, Comptroller's Div., Chrysler Corp.; Everett G. Bliss, named manager of the Price Study Dept.; A. Newton Cole, becomes manager, Tax Dept.; and W. L. Dewey, named coordinator of defense accounting.

Paul C. Dunn, named manager, Los Angeles branch office and warehouse, Inland Steel Products Co.; and H. A. White, appointed manager, Chicago branch office and warehouse.

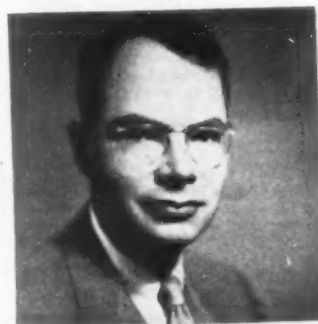
Arthur E. Engstrom, appointed manager, Production & Order Dept., Cleveland District, Republic Steel Corp.; and Edward J. Healy, Jr., appointed assistant manager of the same department for the strip mill.



ROSSER L. WILSON, appointed vice-president in charge of engineering, The Brake Shoe & Castings Div., American Brake Shoe Co., New York.



ROBERT W. KERR, named a divisional vice-president, American Machine & Foundry Co, New York, and group executive of General Products Group.



CARROLL L. WILSON, elected vice-president and general manager, Metals and Controls Corp., Attleboro, Mass.

Personnel

S. R. Hollingsworth, becomes manager, Metal Div., Cincinnati Branch, National Lead Co., succeeding H. W. Hundley, who has retired. C. J. Surman becomes manager, Paint Div.; and W. W. Howard, named manager, Pigments Div.

William C. Woodward, appointed manager of forging sales, Aluminum Co. of America, Cleveland Works.

Thomas M. Murphy, appointed manager of Industrial Sales, Alomite Div., Stewart-Warner Corp., Chicago.

Daniel T. McFadden, appointed manager of sales, Atlantic Div., American Can Co.

Kenneth O. Williamson, appointed sales manager, Osgood-General, Marion, Ohio.

Alan D. Badour, becomes manager, Export Dept., Soiltest, Inc., Chicago.

William N. Hulme, appointed district sales manager of brake shoes, The Brake Shoe & Castings Div., American Brake Shoe Co., New York; John F. Ducey, vice-president, is being transferred from San Francisco to New York headquarters; and John L. Goheen, appointed district sales manager of castings.

Joseph T. Domingue, promoted to assistant sales manager in charge of spring sales at Bristol, Associated Spring Corp.

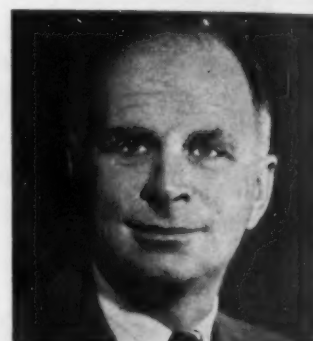
L. L. Reed, named general manager, Albion, Mich., and Somerville, Mass. plants of the Colson Corp., Elyria, Ohio.

Robert F. Elmiger, appointed sales promotion manager, Alloy Tube Div., The Carpenter Steel Co., Union, N. J.

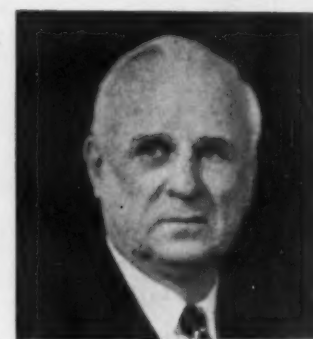
N. P. Norlie, appointed general sales manager, Wilbur B. Driver Co., Newark.



WILLIAM BLACKIE, elected executive vice-president, Caterpillar Tractor Co.



GUY L. MORRILL, elected vice-president, Midwest Piping Co., Inc., St. Louis.



HARVEY W. BALL, named technical adviser to the president, The Morgan Engineering Co., Alliance, Ohio.



JEFFERSON S. GAMBLE, appointed sales manager, Bristol Divisions, Associated Spring Corp.

NEW!

BART LECTRO-CLAD NICKEL-PLATED Steel Plate and Sheet

*for fabricating into
products demanding corrosion and
contamination control.*

Nickel plated on either or both sides by the electro deposition of pure nickel which provides a permanently bonded, ductile and pore-free cladding up to .020" thick. Produced with a new plating technique developed by BART MANUFACTURING CORPORATION and now available in sizes up to 7 feet x 20 feet.

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★ LECTRO-CLAD Plates and Sheets withstand heating, forming, bending and other fabricating processes without change.

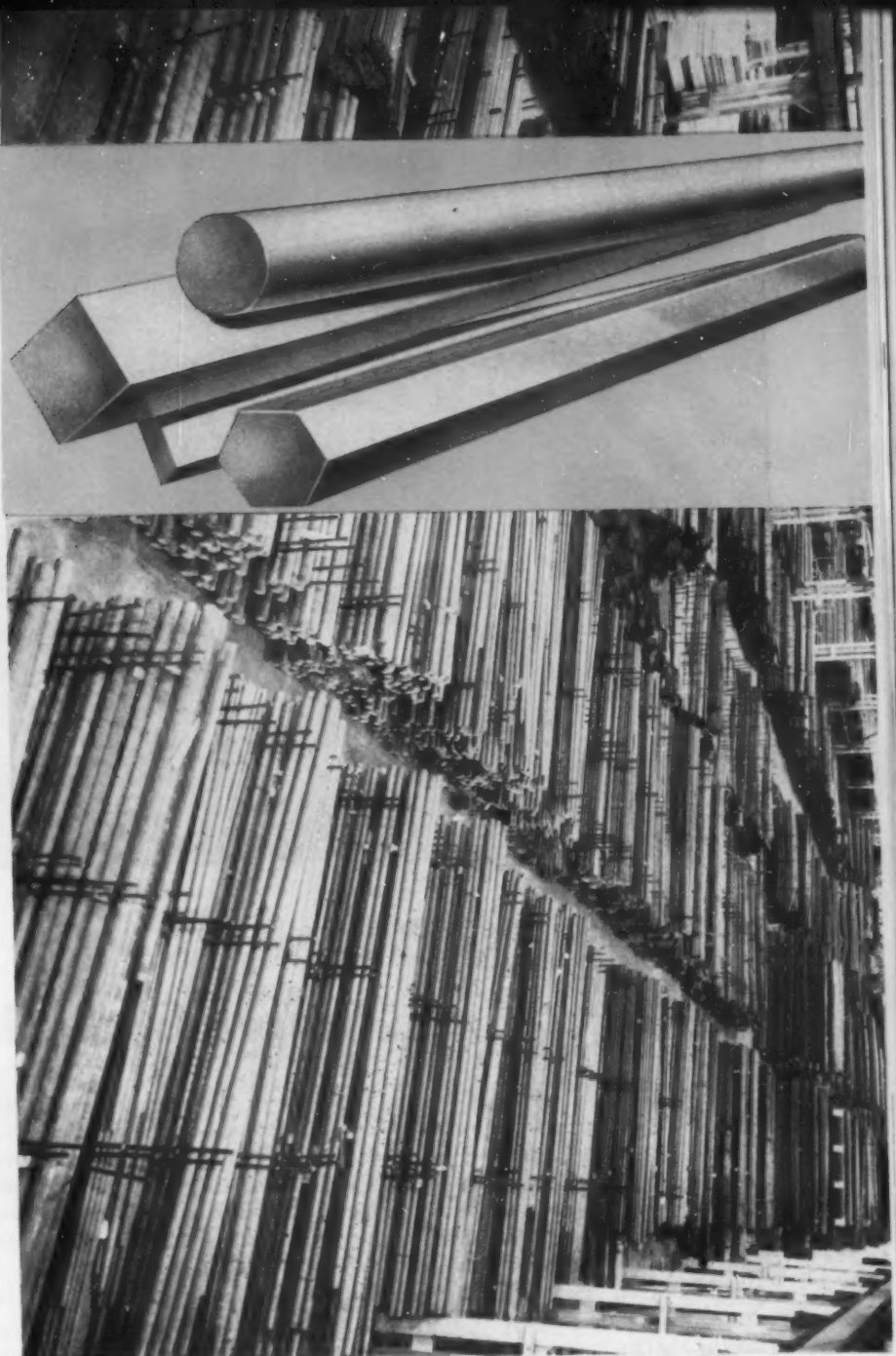
Write to Dept. 1A-6 for details.

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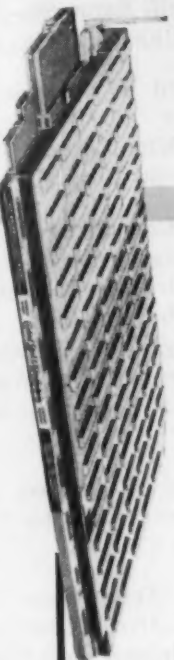
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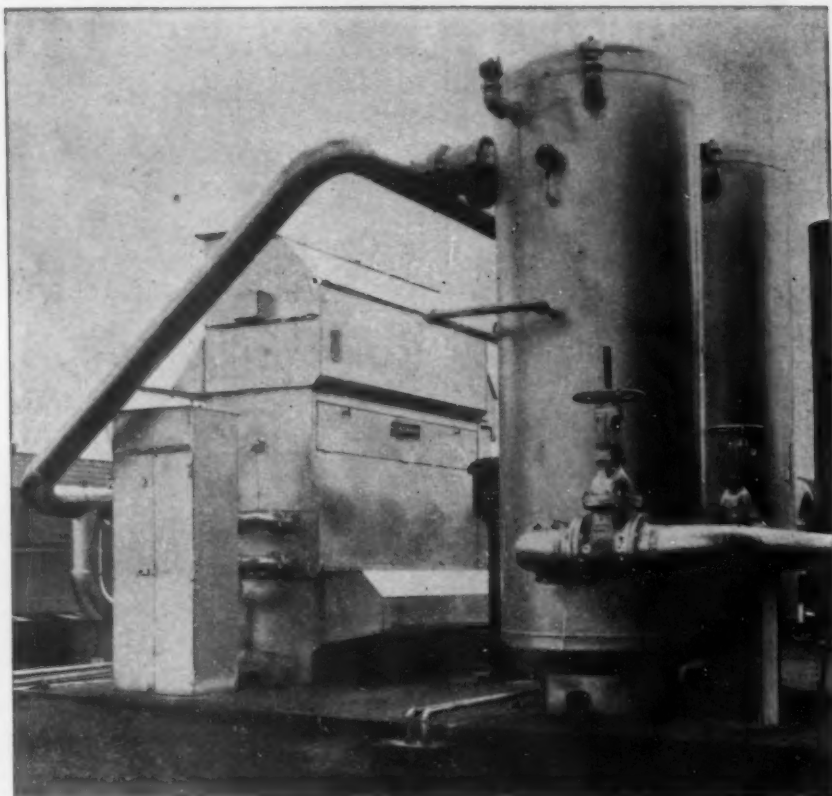
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● Direct saving in the cost of cooling water saves the price of the Niagara Aero After Cooler (for compressed air or gas) in less than two years.

Extra, for no cost, the drier air gives you a better operation and lower costs in the use of all air-operated tools and machines, paint spraying, sand blasting or moisture-free air cleaning. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara Aero After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter by the Niagara Balanced Wet Bulb Control.

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Personnel

George C. Davis, Jr., becomes technical sales manager, new Technical Sales Dept., Kaiser Chemicals Div., Kaiser Aluminum & Chemical Corp.

Jack Mikolajczak, joins Detroit sales staff, Baron Steel Co., newly formed Customer Service Div.

Richard H. Schwank, joins the Customer Service Dept., AirResearch Mfg. Corp., a division of The Garrett Corp.

J. R. Connell, appointed assistant general purchasing agent, Boiler Div., The Babcock & Wilcox Co., Barberton, Ohio; and E. P. Moriarity, C. B. Warner, J. E. L. MacAdam and G. A. Weidersheim, appointed assistant purchasing agents.

William C. Goeckel, appointed sales manager, Snyder Tool & Engineering Co.

Ray L. Totten, appointed sales representative, Milwaukee sales district, Inland Steel Products Co.

Lawrence E. Vogt, appointed district sales representative, The Flibble Co., in Western New York, Pennsylvania, Maryland and District of Columbia.

OBITUARIES

Herbert A. Bernreuter, 53, vice-president and general manager, Simpson Electric Co., Chicago, recently after a long illness.

Alfred W. Ward, chairman of the board, The Brooks Oil Co., suddenly at his home in Cleveland.

Donald C. Leo, 51, secretary and general attorney, Universal Atlas Cement Co., a subsidiary of U. S. Steel Corp., recently.

Arthur H. Hemker, 47, manager of farm, trade and services industries sales for the General Electric Co.

Ernest A. Herrck, 65, manager, Chicago office, National Automatic Tool Co., Inc.

Quality steel without hot tops—

Mill Gives Dornin Process FIRST BIG TEST

By: G. A. Dornin, Jr.
Chief Engineer
Shenango-Penn Mold Co.
Dover, Ohio

R. H. Spence
Melting Supt.
Green River Steel Corp.
Owensboro, Ky.

W. H. Meyer
Plant Metallurgist
Green River Steel Corp.
Owensboro, Ky.

◆ First to adopt the Dornin process commercially less than a year ago, Green River Steel Corp. is now producing sounder, cleaner and denser steel than can be made by conventional methods . . . Sound ingots are produced without hot tops and the yield per ingot is about 12 pct higher.

◆ Steel is melted by fully-killed steel practice and poured into big-end-up molds with very heavy taper . . . They are then stripped and sent to soaking pits, after which they are processed in upsetting and forging presses . . . After another soaking, they are ready for rolling . . . Economy-wise, the process pays off by eliminating hot top cost . . . Yield is higher and rolling is reduced.

◆ **SOUND INGOTS** stem from two basic conditions in steel making—complete deoxidation and progressive solidification from bottom to top. To achieve the latter condition, most steel ingots are produced in big-end-up molds fitted with refractory hot tops. However, this requires a compromise in ingot shape between the short, squatty ingot with heavy taper for maximum soundness and the long, slender ingot with no taper for maximum rollability.

Less than a year ago, the Green River Steel Corp., Owensboro, Ky., started commercial production of ingots by the Dornin process which (1) produces sound ingots without hot tops, and (2) isolates the segregate zone so the ingot can be cropped with minimum loss of good steel.

The process begins with the design of the ingot. A very heavy taper is used and the ingot is made short and squatty. The taper is 9 in., or about 12½ pct of the body length. The ratio of length to top diameter is about 2½ to 1.

Ingots now used at Green River vary in weight from 7960 lb (3 in. down in the mold) to 7330 lb (7 in. down). The top is a smooth round, 28 in. in diameter while the bottom is a 12-flute contour, 19 in. in diameter across the valleys. The lower 45 in. are fluted. This blends into a smooth circular contour over a vertical distance of 12½ in., the upper 12½ in. being smooth and round.

Since no hot top is used, there is no possibility of contamination from this source. Also, there is no hesitation during pouring and thus no chance to drive any non-metallics, which may float upward and lodge in the top surface, back into the body of the ingot.

Cork insulation, about 4 in. thick at the center and 2 in. at the outside, is applied to the ingot immediately after pouring. The ingot mold is of the plug-bottom type. Nozzles used at present are 1¼ and 1½ in. The steel is fully deoxidized since only this type of melting practice can produce a sound product. Two 60-ton Swindell top-

Background of Dornin Process

In August, 1944, the National Defense Research Committee of the Office of Scientific Research and Development published a report during the course of which ingots from eight steel makers were split, etched and tested. All ingots were big-end-up hot-top ingots. The purpose of this program was to determine the effect of ingot flaws which develop in steel-making processes.

Two main ingot defects were prevalent: (1) center porosity in the upper two thirds of the ingot, and (2) concentration of nonmetallic inclusions in the bottom third.

Among the conclusions drawn from this report were: (1) drastic changes in ingot design

to effect the manner of solidification would be necessary to improve the bottom third of the ingot, and (2) the "herringbone" could be eliminated by use of a small length to diameter ingot ratio which would promote progressive solidification.

To correct these difficulties, the late George A. Dornin, inventor, spent many years and performed many experiments with ingots weighing up to 5000 lb. More than 20,000 tons of alloy and killed carbon steels were produced during the tests.

Installation of the Dornin process at Green River Steel Corp. is the first major step toward commercial production of steel by this process.

charge electric furnaces are used for melting.

As soon as the first ingot on the heat solidifies, about 1 hr 35 min after pouring, it is loosened in the mold on a 600-ton Birdsboro vertical bottom plunger stripper. While still in the mold, it is placed on a shuttle transfer car which carries it to the soaking pit building where it is charged. During transfer, the bottom of the ingot rests on a pin which pushes the top 6 to 8 in. of the ingot above the mold so the crane can get hold of it.

The entire transfer from the pouring platform to the soaking pit takes only 3 to 5 min and, since the heat is stripped in the same order and in about the same time in which it is poured, all ingots arrive at the pits at a uniform high temperature. The ingots are vertical at all times and all but the top few inches are protected from any sudden chill by retaining them in the molds until

they are ready for charging into the soaking pit.

The fully-killed ingots are believed to be hotter when charged than has ever been possible before—usually within 5 min of the time they solidify. This is particularly important since the smaller the temperature range through which the ingot cools, the lower will be the stresses in cooling.

In a killed steel ingot, the last metal to solidify, directly under the pipe cavity, contains segregation to such a high degree that it is never usable. In the Dornin ingot, due to the very heavy taper and consequent large top area, the pipe cavity is quite shallow and the segregate zone is a cone-shaped mass of about 6-in. in diam and 6 in. deep immediately beneath the pipe cavity. The primary object of the Dornin process is to isolate this segregate zone. To do so, the pipe cavity is in effect turned inside out.

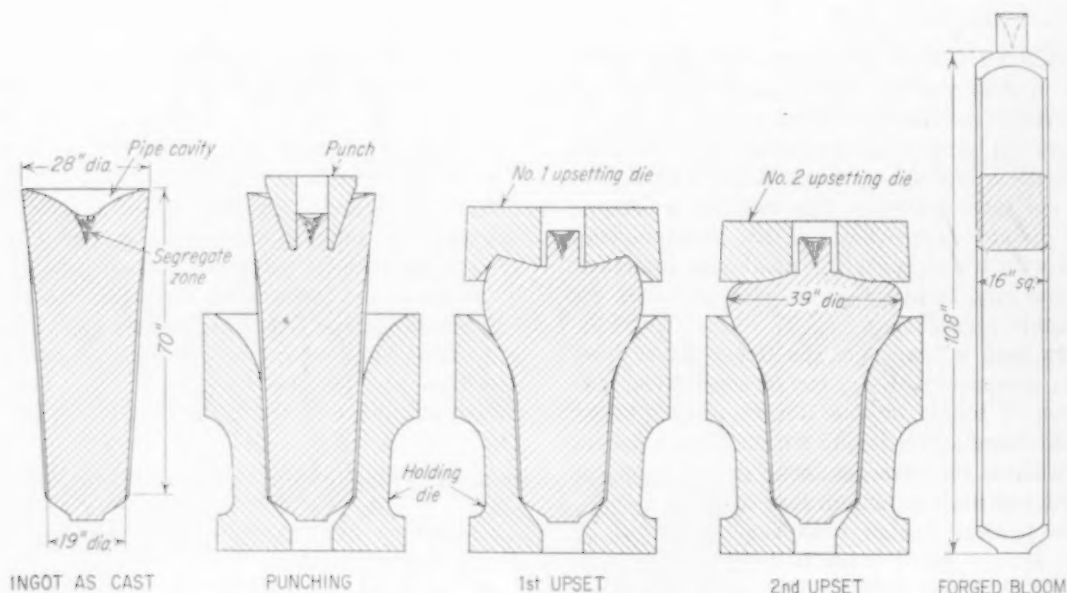


DIAGRAM represents steps in Dornin process to achieve soundness and extreme density in

steel ingots. The process also results in blooming mill yields of about 90 pct.

After the ingot is heated and soaked just as it would be for rolling, it is placed vertically in a cast iron holding die which is mounted on the moving bottom platen of a 2500-ton up-setting press. This platen then slides to the press center-line where a punching and two upsetting operations are performed.

First a hollow, tapered steel punch is driven into the ingot to the bottom of the segregate zone. The lower cutting edges of this punch are protected by a heat-resistant weld deposit. This separates the core containing the segregate from the sound steel surrounding it. In the next step this surrounding metal is driven down past the bottom of the core with two successive upsetting dies.

The segregate zone is now isolated but the mushroom-shaped upset ingot is not in rollable condition. Therefore, the ingot is transferred to a 1500-ton forging press where it is forged to a 61-in. square by 9-ft. long ingot. During this operation the ingot is first held at the bottom end by a 5-ton manipulator while the bulged upper portion is forged from about a 39-in. diam to the finished size. It is then passed through the press to forge the lower part. This completes the Dornin process and the forged ingot then goes to the hot scarfers.

The hot processed forging is carried by means of a floor-type charger to one of three scarfing stations. At each station, bloom turners rotate the forging during scarfing so that all four sides can be properly conditioned. Scarfing torches are specially designed. Each station also has a hydraulic system for removing scarfing slag, and platforms and shields for the operators.

All surface defects, including tears that may have developed during forging, are removed by hot scarfing. The hot forging is then recharged into the soaking pits. Here again, the sound steel-making principle of keeping the steel hot through-

out its entire production cycle is applied to keep internal and external cooling stresses to a minimum.

After a flash reheat, forgings are rolled to finished size on a 24-in. two high reversing blooming mill and a two-stand bar mill, one a three-high and the other a two-high stand. Top crop is usually taken on a shear between the bloomer and the three-high stand. The butt crop is taken on a hot-saw. Slow cooling, inspection and final conditioning complete the cycle.

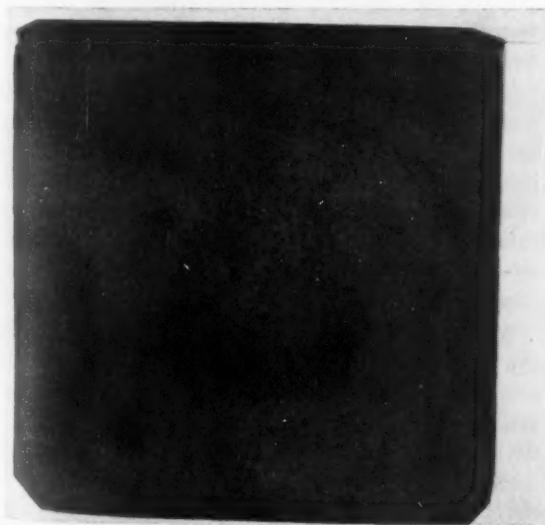
In conventional pouring of ingots, there are a number of sources of nonmetallic inclusions in steel. The spalling of refractory from the hot top itself is one. A second arises from the necessity of forming a seal at the juncture between the mold and the hot top. This usually means a pause and often a complete stop-pour at this point.

Taper promotes ingot soundness

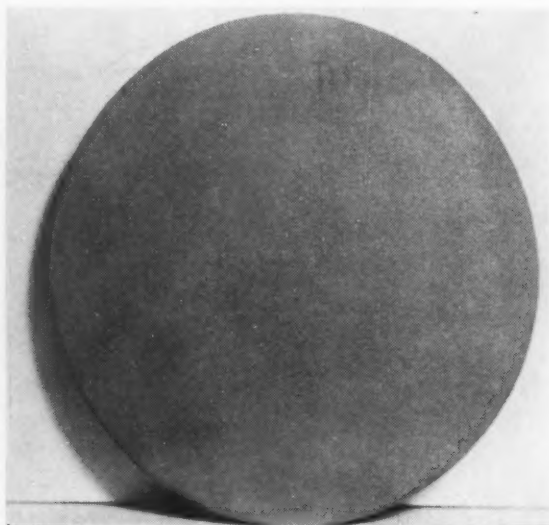
In back-pouring, still common practice with clay tops, the body or hot top of another ingot is poured while the seal is freezing. During this time, nonmetallics tend to float upward and concentrate in the top of the ingot. When the hot top is poured, the pouring stream force drives them back to the bottom of the ingot where many remain since the steel in this zone has cooled somewhat and is much less fluid.

In the Dornin process, use of a short, squatting ingot with very heavy taper promotes ingot soundness and insures progressive feeding from bottom to top. Also, due to the absence of the hot top, two serious sources of nonmetallic inclusions have been eliminated.

The ingot-delivery system permits charging the ingots into the pits at a very high temperature thereby minimizing cooling stresses. As a result of these practices, ingots charged into the pits are sounder, cleaner and more nearly stress-



MACRO-ETCHED section of 14 x 14 in. bloom-type C-1045 ingot shows clean, sound and dense metal immediately below the top discard.



TRANSVERSE ETCH made just below top cropped section of a type C-1045 8 1/4-in. round again shows soundness obtained by process.

"The ingot's cast structure is changed to a wrought structure during press operations . . ."

free than those made by conventional methods.

The tremendous amount of hot work done on an ingot under presses adds the quality of extreme density. The ingot's cast structure is completely broken up during these operations and a dense wrought structure results. For example, in upsetting, the diameter is increased from 28 in. to 39 in. an increase in area of 100 pct. The compressive effect of this upset extends all the way to the bottom of the ingot. The result is very nearly the same as is obtained in fully closed-die forging which gives the densest crystal structure of all forms of mechanical work.

During forging, the ingot receives still further hot work, the average ratio being about 2:1 and the reduction of the upset bulge actually being 4.7:1. The latter occurs at the point where secondary pipe and porosity are most prevalent in hot top ingots. Thus, the mill gets a forging which has received drastic work on all three directions.

Forging produces a denser structure than rolling. Moreover, this density is more nearly uniform from the surface to the center. Dornin processed steel has this forged structure before it gets to the mill, and in addition receives further refinement in rolling.

The two presses used in processing ingots were designed by Hydropress, Inc. Both are water-

hydraulic machines operating at 4250 psi. It consists essentially of two 5-cylinder Aldridge pumps, each driven by a 500-hp motor and a pistonless air-water accumulator. The accumulator acts as a reservoir for storing high-pressure water, making it possible, to use water faster for short intervals than the pumps can supply it.

The 2500-ton upsetting press was specially designed for this job. It has a 132-in. opening and a 78-in. stroke. The bottom slide, which carries the holding die, is actuated by two single-acting hydraulic cylinders with 78-in. strokes. The punch and the two upsetting dies are mounted on slides on the upper moving crosshead. They are moved to and from the press axis by hydraulic cylinders.

All tools center within 1/32 in. A 100-ton stripper is located under the "out" position of the bottom slide to eject the upset ingot. All tool movements have push button controls. The entire cycle, for punching, upsetting and positioning three tools takes about 1 min 40 sec.

Forging is performed on a 1500-ton press with 100-in. daylight, 53-in. opening between dies, and a 48-in. stroke. Columns are on 48 by 84-in. centers. Forging dies have a front-to-back dimension of 24-in. and a 14-in. flat face.

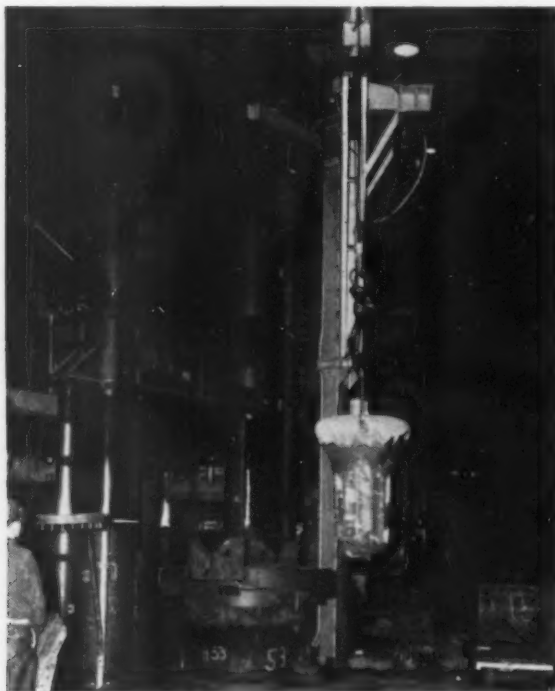
Safety devices reduce failures

Both presses have servo-powered operating levers and numerous safety devices to protect them against failure in the hydraulic system. Both are of 100-pct welded construction. Each press has its own hydraulic scale-removal system.

Transfer of the upset ingot from the 2500-ton press to the 1500-ton press is done by a jib-crane and a transfer car. As the ejector pushes the ingot upward in the holding die, it is picked up by a pair of Heppinstall tongs on a lift-swing jib crane. The crane swings 90° and places the ingot in a special cradle on a transfer car. The upset part of the ingot rests in the cradle and the bottom 2 ft projects so the ingot can be picked up by the forging manipulator.

Since operations on the 2500-ton upsetting press are inherently much faster than the forging operation on the 1500-ton press, production of the latter determines the output of the entire installation. Although the installation is too new to obtain exact production figures, hourly production to date has been 15 ingots or about 60 tons of steel.

Main advantages of the process are; first, hot top cost is eliminated; second, yield is increased; and third, rolling cost is reduced. As yet, the exact worth of these advantages has not been determined. Yield, for instance, has varied somewhat since everything is based on ingot-to-shipped product yield and all variable losses are included. Lower rolling costs stem from the ability to roll a heavier piece with a higher yield with the same number of passes required for a lighter hot-top ingot.



UPSET INGOT is transferred from upsetting press to forging press. Compressive effect of upset extends to bottom of ingot.

Space limited—

Height Used to Advantage in Revised Storage System

♦ To accommodate a stepped up flow of raw materials in limited storage and handling areas calls for careful planning . . . If you can't spread out, you must go up toward the ceiling . . . Bin racks for heavy materials can be redesigned for more height, greater strength . . . If they're strong enough, you can pile bin replacement stocks on top of the racks.

♦ Other storage racks beat the height problem with hollow, tapered corner legs . . . They telescope to add new layers . . . Tote boxes of uniform size will stack safely to store small parts . . . Sheet surfaces won't scratch if parts are handled in plywood "sandwiches."

♦ **STORAGE** and material handling space was already at a premium when Navy production at Douglas Aircraft Co.'s El Segundo, Calif. Div. was rapidly expanded. Volume and variety of incoming raw material was greatly increased, but it was not feasible to build or rent new storage facilities: Revised methods had to be applied to existing storage areas.

In one such area, shown in an accompanying photograph, bin storage is needed for long, heavy metal stock. Normally this calls for a rack one deck high for efficient stock issuance and bin replenishment. This type of rack solved the primary storage problem, but valuable upper level space went unused. To utilize this upper area space, the bin storage racks were redesigned and stressed to accommodate large wooden warehouse boxes. Each box is adequately reinforced to store replacement for the bins below.

The unique box design allows equally effective storage of light as well as heavy, bulky stock. Boxes are open at the top and have a hinged drop front. When a small quantity of light material is required, the stock clerk merely opens the box front to get the proper amount.

If a large quantity of light material or some heavy or large size is needed, the correct box is lifted from the rack, carried to an open area and



By K. R. Benfield

Chief of Material
El Segundo Div.
Douglas Aircraft Co., Inc.

lowered alongside movable trailers. The material is loaded on these trailers and hauled away for further handling and delivery. The box is immediately replaced on its rack.

Another feature of this storage method is its flexibility. Each box has an inventory number printed in large, bold type. Materials in the boxes are assigned storage locations according to box number only. This permits free movement and placement of the boxes within a designated area.

Rack features balcony storage

Another example of height utilization is a storage rack with an upper deck for balcony storage. The lower section is 7 ft high and 19 ft deep; the upper is 7 ft high and 15 ft deep. Total storage height is 14 ft. Rear of the lower section is used for storing short lengths and cull stock. An identical unit was installed just opposite this rack with a pull area of 22 ft between

Extremely heavy or bulky items are stored in a specially designed steel unit. This rack can be used for practically all materials, including steel and aluminum bar, tube, extrusion, and spar cap, as well as leather, felt, wire cable, and box and carton goods. The basic rack may be heightened for extra storage by using tubular corner sleeves. These units can be served by carloaders or over-



STURDY racks carry replacement stocks in wooden boxes with front and top openings.



BALCONY type steel racks store raw stocks for sawing dept, make good use of extra height.

head cranes with suitable lifting devices.

A medium size steel tote box was designed to store intermediate size parts and parts which cannot be individually supported in a standard rack. Items most commonly stored in these boxes are castings, forgings, large purchased parts and small to medium carton items. The units allow maximum use of height since they can be stacked safely. At the same time they provide uniform storage. All tote boxes are designed for handling

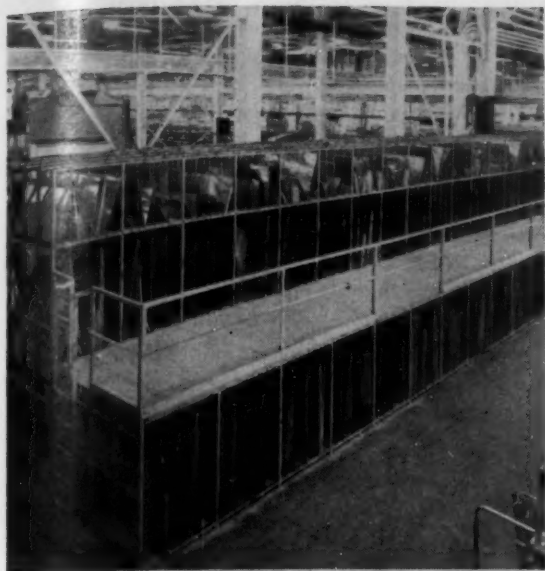
by carloaders, cables or crab type lifters.

The firm's metal shearing section has an ever present storage problem. Vendors deliver the bulk of aircraft quality aluminum sheet stock in uniform cases or skid type containers which do not require special storage devices. But when skids or cases are opened to provide sheet stock for miscellaneous production, the storage and handling problems multiply greatly.

The metal cutting section maintains a ready



TUBE and bar storage racks feature tapered hollow supports to add extra layers as desired.



ALUMINUM sheet is stored on edge, removed between plywood sheets for surface protection.



SHEARED blanks travel by conveyor (upper right), surfaces protected by tissue interleaves.

supply of sheared aluminum sheet stock in full and partial sizes and in cull dimensions. Being extremely susceptible to surface abrasions and harmful scratches, the sheared stock is difficult to store and protect against damage. This working supply of sheet is now stored on edge in special racks. Full sheets are stored in the lower sections while partial sheets and culls are kept in the top rack sections.

Care is taken not to overload any bin with

sheets. Friction contact may produce surface damage ranging from minor abrasions to deep scratches. Plywood liners protect sheet material being removed or replaced in the rack bins. Before a sheet is pulled from a bin it is separated from adjacent sheets with plywood liners. Then the desired sheet is withdrawn from this plywood "sandwich."

Sheared parts are packed as a unit or separated by tissues for conveyor travel.



NUMBERED tote boxes (upper center) store parts that cannot be carried on regular rack designs.

For "problem" designs—

Cast Difficult Parts In Mercury Pattern Molds



By Davidlee Von Ludwig
Consultant
Brooklyn, N. Y.

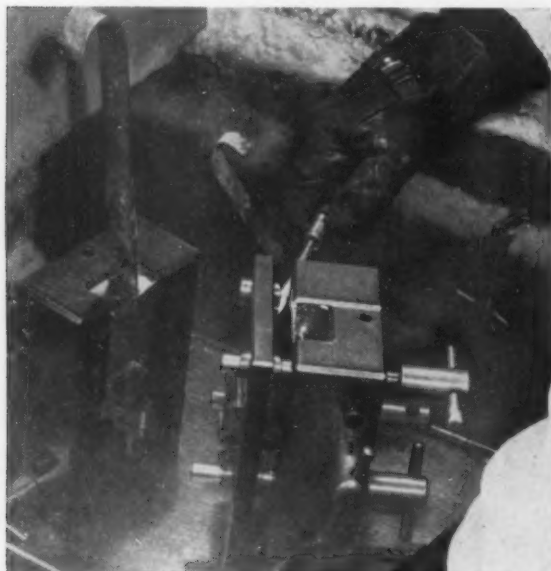
◆ TECHNICAL AND PROCESS differences inherent in the mercury pattern system permit greater latitude in design and production of "problem" precision castings. Ability to adhere more closely to difficult tolerances and to cast sections beyond the scope of other foundry meth-

◆ Problem parts with unusual mass, thin section or contour complexity may often be most successfully precision cast in ceramic shell molds made from mercury patterns . . . Mercury has unique advantages in production of intricately shaped patterns.

◆ Ceramic shell molds produced from the frozen mercury patterns are less subject to expansion-contraction strains . . . High surface smoothness of the mercury pattern is reflected in molds.

ods make the process especially valuable in producing many difficult parts.

Advantages of the mercury process, Mercasting, stem from: (1) Ability to make more difficult and more intricate molds. (2) The unique features, for casting, of the ceramic shell mold



COMPLEX MOLD contours, difficult coring are easily made with mercury and booking dies. Here, leaf is removed from wave guide die.



CLOSING HALVES of a booked mercury pattern die after leaf with core impression is removed. On contact, frozen mercury halves weld.

produced from the frozen mercury pattern.

Mercury has a precise melting point. When pure, it does not have a "mushy" transition range between melting and freezing. This property is useful in forming intricate, close toleranced, thin wall patterns which are stress free. Control of solidification, avoidance of shrinkage, high mechanical strength and resistance to distortion are possible when mercury is used as a pattern material. These factors help produce a superior precision casting mold.

Ceramic shell molds are built up by dipping the frozen mercury (-80° to -130°F) pattern into slurries of different viscosities. Usually the first slurry is composed of very fine particles of the refractory oxides of titanium, zirconium, alumina and other materials. These are usually in a freon type vehicle. From 3 to 20 coats are applied.

Mercury easily extracted

The frozen mercury is easily extracted from the shell by pouring molten mercury over the sprue in each mold. The ceramic shell mold has sufficient "green" strength to permit extraction of the pattern. The shell may be placed directly in the firing oven at the desired temperature with no risk of thermal fracture.

The thin ceramic shell walls, rarely more than 0.025 in. thick, heat through and expand uniformly on firing. They also cool uniformly. Shells may be completely fired in 2 hours as compared with the more than 24 hours often required for investment mold firing cycles.

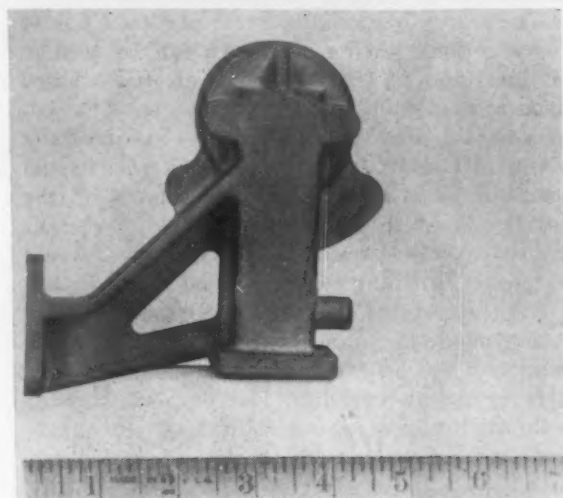
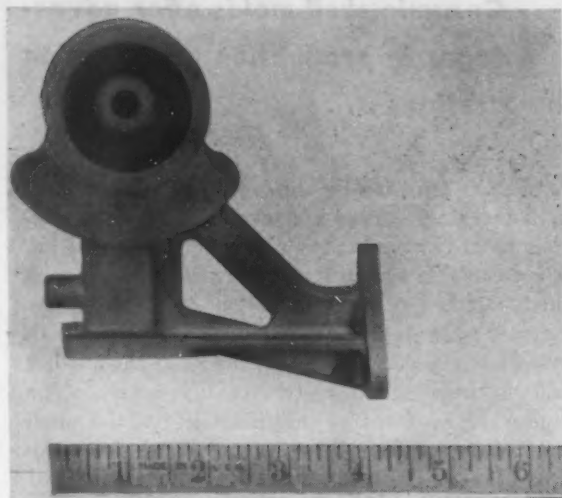
Usually it is not practical to investment cast parts with tolerances better than ± 0.005 in. per inch when product dimensions exceed from 6 to 8 in. in any direction. Castings in excess of 30 in. have been cast from mercury patterns with tolerances held to the desired limits.

For the high refractory alloys, the method permits casting of designs embodying internal passages of high intricacy which may not be accessible to machine tools for finishing. Sections of steel and cobalt alloys as thin as 0.012 in. may be accurately cast for a reasonable area.

Shell resembles dipcoat

Control of casting dimension is extremely complex. In the investment process there are a variety of expansions and contractions to consider. Setting up of the soft metal die entails variable shrinkages. Injection, cooling, ejection, quenching or other cooling of wax or plastic patterns creates stresses which cause dimensional differences from pattern to pattern.

In some respects the mercury pattern ceramic shell resembles the "dipcoat" applied on wax or plastic patterns to form silica base molds for ferrous or high temperature nonferrous alloy castings. The dipcoat is applied to wax or plastic by dipping the cluster in one or two slurries of moderate viscosity. Often these slurries contain



TYPICAL WAVE GUIDE casting of 356-T6 aluminum alloy is readily cast by Mercast process. Internal coring is simplified with booking die.

the same refractory oxides used to make ceramic shells from mercury patterns.

The dipcoated pattern is placed in a steel flask, backed by a coarse slurry of silica sand, quartz, magnesium oxide and other constituents and fired. Differences in thermal expansion and contraction between the support material and the dipcoat set up strains during firing. These and other strains caused by expansion of the wax or plastic patterns before they soften and flow out of the mold often cause defects in the molds. The stresses are overcome in the frozen mercury process because of mercury's lower volumetric expansion rate on melting and ability to control melting.

The ceramic shell mold also offers advantages over the usual investment mold in suction casting where air is drawn out of the mold cavities in advance of the entrance of molten metal. Consistent wall thickness of the ceramic shell creates a more uniform section effect from top to bottom of the mold and permit more uniform filling to take place. The progressively greater resistance

Ceramic shell molds offer advantages in production of precision castings . . .

to suction afforded by the solid investment mold and steel flask causes a marked difference in suction from bottom to top of each mold, resulting in measurable size differences in castings in each cluster.

Shell molded parts tend to be smoother than investment molded castings when the alloy being cast is inclined to be chemically active. The higher rate of metal solidification in the shell leaves less time for chemical roughening to take place due to interaction between the metal and the mold.

The search by the investment casting industry for a ceramic shell mold which can be used in conjunction with wax or plastic patterns is based upon economic and quality advantages. The cost of ceramic shell molds would be substantially lower. Materials used to form the shell would constitute less than 10 pct by volume of the amounts used to form conventional investment molds. Process losses due to thermal stress would be lower. Finishing costs would be reduced.

Higher costs of operation with mercury are largely due to the more costly dies required. Until recently it was believed possible to cast and freeze mercury only in steel dies. Mercury amalgamates with practically every other die metal. Steel pattern dies had to be more precisely designed and

built than the dies used to form wax or plastic patterns, because operation at very low temperatures imposed more rigid tolerance restrictions.

The "soft metal" die technique uses alloys of tin, lead, zinc, bismuth, antimony and cerium in short run dies to form wax and plastic patterns. A comparable die is not yet available to cast mercury. However, recent research in protective coatings which would prevent amalgamation of mercury and various "soft" die metals has been successful.

It now appears likely the greatest single cost differential between mercury and wax patterns will be overcome. Wax dies may often be made so economically that "production" runs as low as 100 units are common. When a soft-metal die for mercurizing is perfected, the same will be true for this process.

The cavitation tendency of plastics limits its use to designs of uniform section and comparative simplicity. Injection dies for plastic patterns must be single parting, which further limits the applicability of plastics.

Intricate coring possible

Coring intricacies may often decide whether a part should be precision cast or from mercury pattern molds. A unique property of frozen mercury is that pieces of the metal instantly form a perfect weld when brought into contact. This has permitted development of the "booking die" method of forming patterns with internal undercuts which cannot be formed with "draw" cores or the usual types of insert or collapsible cores.

A booking die usually consists of three sections. Two exterior die halves form the external details of the pattern and an insert plate upon which the cored passage details are mounted. Mercury is poured into the two sections of the booked die and frozen.

After the pattern halves freeze the die sections are parted. The core plate is removed and the two half patterns are closed together, still within their respective sections, whereupon they bond into a non-separable unit. A well built booking die will produce an error in the weld of less than 0.002 in. The resulting pattern is then dipped to form the mold. The slurries flow into all crevases of the interior and with some manual rotation, all details are uniformly coated.

Investment foundries have experimented with welding wax and cementing plastics to produce patterns and resulting cast parts with internal details comparable to the results afforded by the mercury "booking" die. Biggest problem has been the difficulty of removing the ceramic core materials which fill out the pattern when it is invested. The dipped core formed in the ceramic shell mold made from a mercury pattern is invariably hollow and easily broken. Impacts with an air rapper break off the ceramic shell on the casting exterior and shatter the hollow cores so that their extraction is no problem.



CERAMIC SHELL MOLDS are easily removed from castings with air rapper. Internal cores break and fall out freely during this operation.

Materials application—

Precoated Stock Helps Cut Production Costs

♦ PRECOATED STRIP stock used in making bezels and action plates for pressure and temperature gages has permitted several manufacturing economies at the Rochester Mfg. Co., Rochester, N. Y. Process time has been shortened, production costs on these items have been halved and inventories have been reduced.

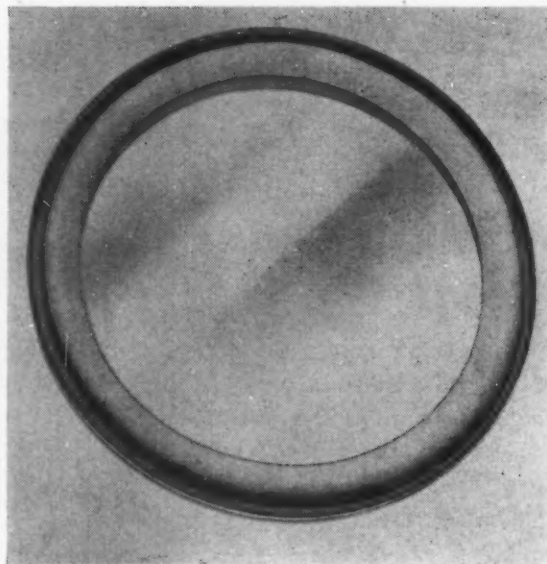
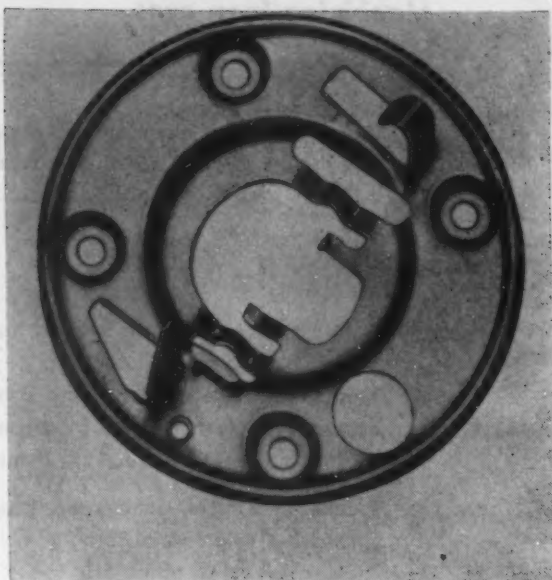
Use of prefinished coil has eliminated finishing after fabrication. Result has been a 50 pct reduction in manufacturing costs on these parts plus a speedup of goods in process. This in turn reduced the in-process inventory of metal and shortened the lead time between receipt of order and delivery of finished gages.

Previously it had been necessary to clean, spray and bake the bare parts after stamping and forming. Even though the parts were sprayed by machine, it was sometimes necessary to strip and rework them. Incomplete cleaning, improperly mixed lacquer, or variations in baking temperatures caused rejects. Finish on preprinted coil is more uniform, and rejects have been reduced. The tough, adherent enamel precoat is unaffected by press forming and stamping operations.

The stock, supplied by Enamel Strip Corp., Allentown, Pa., in coil form is fed directly into the presses with no pretreatment. After leaving the press, bezels and action plates are ready for immediate assembly operations.

Material used for the bezels must provide an attractive appearance as well as resistance to corrosion. Rochester Mfg. Co. purchases red, black and orange coil, 0.010-in. thick, 2 $\frac{5}{8}$ -in. wide, and coated on one side. Mounted on farm and industrial tractors, earth moving equipment and other off-the-road equipment, gages can be furnished in a color which will harmonize with colors used to paint the equipment.

Action plates, mounted inside the gages, are made from Enamelstrip gold lacquered on both sides (for maximum corrosion resistance) and furnished in 0.020-in. thick by 2-in. wide coils. Scrap loss on both parts is held to a minimum by furnishing the coils in the optimal width for the application.



USE OF PRECOATED STRIP permitted several production economies in manufacture of bezel rings with seal and catch plates. The parts, used in pressure gages, match equipment colors.

Accurate Setups Cut Tool

◆ Replacing dull, worn cutting tools is often a major downtime factor in production machining . . . One large plant has cut these time losses to a minimum and increased work output by using an accurate, almost foolproof tool setting device . . . Precise tool settings no longer depend on manual skill.

◆ Scales, verniers, dummy workpieces and special gages were replaced by these tool setters . . . Over 375 are in use plant wide . . . Tools are reset in automatic turret lathes while machines are operating . . . Downtime averages only 24 sec per tooling station . . . Design of the tool setters insures repeat accuracy.



By Wayne Stone
Process Engineer
Lycoming Div.
Avco Mfg. Corp.
Stratford, Conn.

◆ **TIME CONSUMED** in changing and resetting cutting tools is a major problem in many production machining operations. This problem has been solved with impressive savings and increased production in several machining sections at Avco Mfg. Corp.'s Lycoming Div. in Stratford, Conn.

In the manufacture of Wright-licensed engines at this plant, many operations require multi-tool automatic machines. Number of tools per machine may run as high as 20 or 25. Resetting replacements for broken or dull tools with the aid of scales and verniers meant hours of downtime, and some loss of accuracy control.

This replacement downtime has now been reduced to a minimum. In some automatic

turret lathe operations it is almost completely eliminated. Lost time from complete tooling changeovers is also being drastically reduced.

These savings have been made possible through extensive application of a commercial tool setter. In addition to its time saving features, this basic production accessory allows an operator to set his tools to repetitive, ideal accuracy.

Some shops attempt to replace a dull tool by setting the new tool to the last cut made. Since the last cut was made by the worn tool the replacement cannot be accurate. If pursued, this practice will produce progressively unacceptable pieces.

Another method of tool setting uses a dummy

TOOLING station on an automatic lathe in the steel crank-case line. Changing and setting tools at such stations previously averaged 1.75 hours.



Changing Time, Speed Production

piece. Even if the dummy is accurate the setting depends on the operator's skill. This can be extremely difficult where a tool must be set in two directions. The use of dummy set-up pieces has been very effective in multi-drilling operations to center drills or reamers. But in automatic lathes, the lost time involved in handling, mounting and removing the set-up piece makes this method far from ideal.

Special tool setting gages provide a degree of accuracy but downtime continues to be an important factor in the overall cost picture. These gages are usually made to highly precise requirements, theoretically established before the cut is ever made. And these precision requirements may result in a heavy, rigid and unwieldy gage.

Since these gages are designed to match tool and tool holder drawings, expensive alterations may be necessary. Often the tool or tool holder is changed to improve the cut or extend tool life. If these changes are not indicated on the tool or block drawing, a tool setting gage made to match the original drawings would automatically require alteration.

Also, with the usual special gage the correctness of the tool setting depends on the skill of the operator or set-up man. The gage must be placed on the block in exact position and held there with just the right amount of

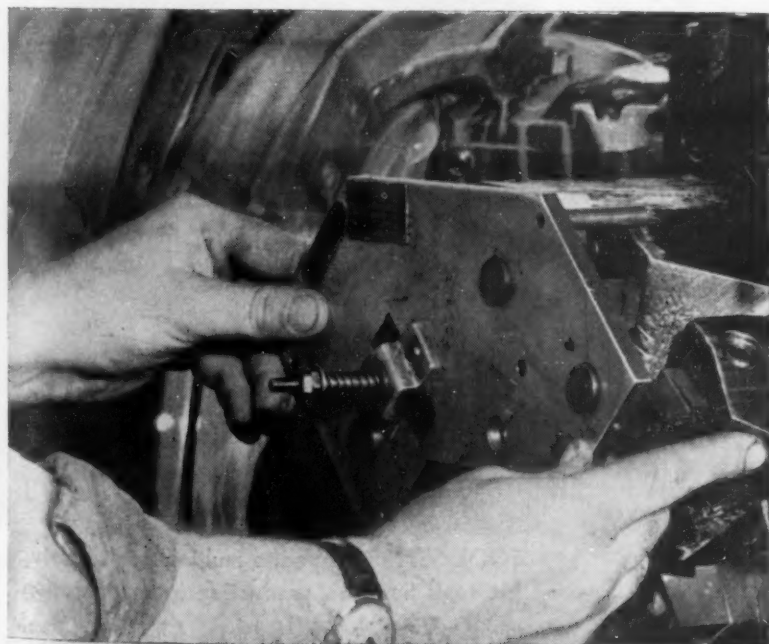
pressure. Since the gage only *checks* the tool setting, the tool may have to be set, checked and reset several times before the right setting is achieved.

Use of these methods pointed up the need for a tool setting device as nearly accurate and fool proof as possible. At the Lycoming Div. plant, many of these tooling problems have been solved by the use of Micro Pin tool setters on long run jobs.

Setter is positive, accurate

Basic tool setter principles are quite simple. Flat plates hold a magnet-spring assembly, plus necessary locating legs, stops and tool setting pins. Three mounting legs locate against the tool holder and are always placed so as to form a tripod around the magnet. Three stops square up the tool setter and eliminate any possible error in locating on the tool block. Depending upon the shape of the tool holder, the stops are located as close as possible to the setting pins. This minimizes any shift which might be caused by temperature changes.

The tool setter is locked in position by means of a magnet under adjusted spring tension. This leaves both hands free to change the tool. Once this spring tension is set it remains constant, assuring the same pressure each time the setter is used.



A TOOLSETTER sets three of the tools shown on the opposite page while another station is cutting. Downtime is eliminated and production doubled.

Production has almost doubled on one group of 14 automatics . . .

For repetitive accuracy, the setters are designed, built, and applied to match tool holders only after they are in operation on the machines. Setting pins are left oversize. After the tools have been set in place, the first trial cuts are made. Compensation is provided for such machine variables as pressure or machine wear. This finely adjusted setup becomes the master to which the tool setter is set and ground.

The setter is positioned on the block, and the setting pin pushed tight against the tool and locked in place with a set screw. The pin is then ground flush with its bushing and the set screw is loosened. This permits the pin to float, and insures that the setter will reproduce the exact tool setting each time it is used.

As long as the design of the tool is not changed or the tool holder shifted from its original location, the setter is a quick, easy and fool proof accessory. Where an extremely close setting is desired, an indicator is added to the setter.

At the Lycoming plant more than 375 of these tool setters have been applied on Fastermatic turret lathes, LeBlond lathes and Bullards.

The widest tool setter use is on Fastermatics in the steel crankcase line. In the roughing and semifinish operations crankcases are run

in halves. There are four roughing lathes and three semifinish machines for each half; a total of 14 lathes at this point in the line. In all, 166 tool setters are used in these operations.

Without the use of these tool setters, estimated average time to retool one station on one of these lathes is 1.75 hr. Actual tool change time per station when using the setters is from 3 to 5 min. These few minutes do not figure as machine down time, since on at least 90 pct of the stations the machine is not stopped to change tools.

Applying the 90 pct estimate to the 3 to 5 min change time gives an average of 24 sec actual downtime per station. Thus, time saved per station will average 1.74333 hr. The accompanying table shows how an estimated 62.76 hr of tool change downtime are saved each working day on the group of 14 machines.

Along with the machine-hour saving in this department, production has approximately doubled since the tool setters were applied.

Similar tool setters are planned for an automatic turret lathe operation on the magnesium nose section line. Two models of this part are run through the same machine, which means that the machine must be completely retooled and reset with each part change over. The change now takes a set-up man, who is thoroughly familiar with the machine and both model set-ups, approximately 6 hr. It is conservatively estimated that by using tool setters, the complete change over can be made by any one concerned in a maximum of 2 hr.

Design changes on tools and tool holders

HOW TOOL SETTERS CUT DOWNTIME

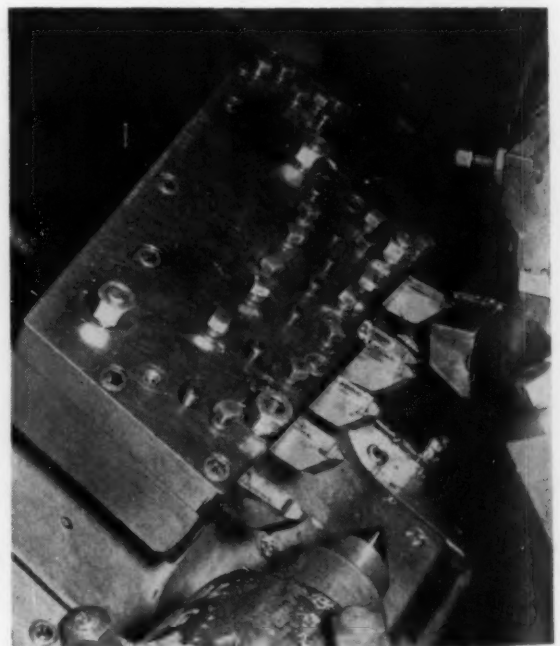
Department: Automatic Turret Lathe Section, 14 Machines		
Part: Crankcase		
Operations: Rough and semi-finish		
Prev. Avg. Downtime per Tool Station . . .	1.75	Hr
Avg. Downtime with Tool Setters . . . . .	.00667	Hr
Avg. Time Saved per Station	1.74333	Hr

Roughing Operations

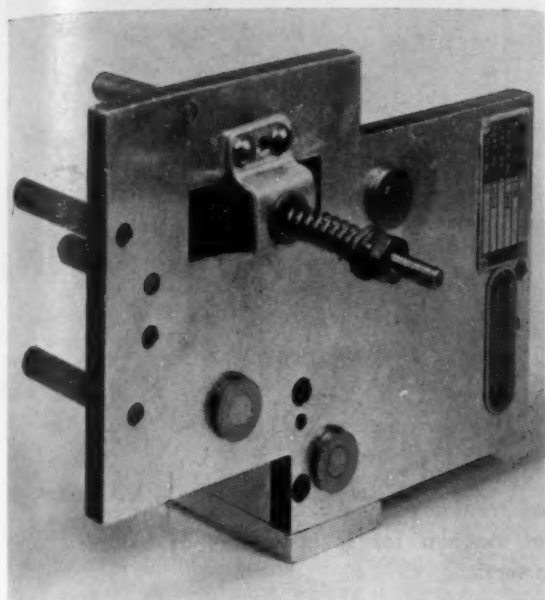
No. machines	8
No. stations	48
Est. tool life	2 days
Est. saving every 2 days	83.68 Hr
Est. daily saving for 8 machines	41.84 Hr

Semi-Finishing Operations

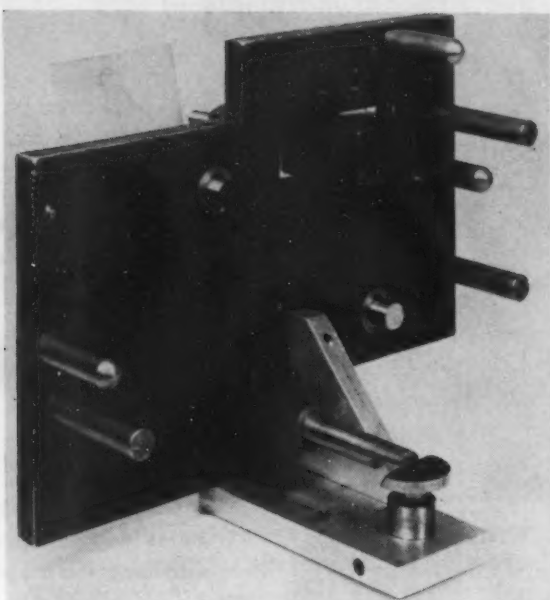
No. machines	6
No. stations	36
Est. tool life	3 days
Est. saving every 3 days	72.76 Hr
Est. daily saving for 6 machines	20.92 Hr
Est. total daily saving, 14 machines	62.76 Hr
Est. yearly saving, 14 machines	15,313 Hr



TOOL SETTERS expedite multiple tooling setups (six tools here) on production lathe operations.



FRONT VIEW of a typical tool setter shows the table, magnet-spring, three pins and bushings.



REAR VIEW of setter shows short mounting legs, three stops, magnet and setting pins.

must be carefully controlled so that the setters can be changed accordingly. This is done at Lycoming by a complete cross reference file of setters, tools, tool holders, stations and machines. Each tool setter is also stamped with its own number, plus the number of its proper tool block, station, part, and operation. Chances are remote that a tool or tool holder can be changed without the matching tool setter being changed. Changes to the setter are usually

minor, involving only a resetting and regrinding of the setting pins.

Since the tool setters are very carefully made, their successful use depends on the accurate relationship between mounting legs, stops and setting pins. They cannot be thrown about on benches or tool stands. For safer storage, holes in the tool setter tables are used to mount the devices on wooden peg boards. They are located close to point of use.



THREE TOOLS are adjusted quickly with tool setter specially designed for this operation.



VARIOUS tool setters are conveniently mounted on peg boards near the machines they serve.

Cold Treatment Increases Strength, Stability of Magnet Steels



By W. G. Patton
Asst. Technical Editor

♦ Use of low temperature treatment by AC Spark Plug Div. promotes uniform quality of magnets for speedometers as well as stabilizing the magnets in service.

♦ Using wrought bar steel, AC brazes 16-ft lengths together, heats automatically in an induction coil, cuts to length and forms and oil quenches without manual handling . . . An automatic machine inspects and accepts or rejects parts at rates up to 2000 pieces per hour.

♦ Elimination of manual handling plus close control during each step of the process has justified the use of relatively expensive wrought steel rather than cast-to-shape magnets.

♦ **WROUGHT FERROUS** materials used for delicate magnets have a number of peculiar characteristics that have not increased their popularity with metallurgists. For example, to provide adequate magnetic strength suitable for speedometers, considerable alloy must be present. Speedometer magnets produced by AC Spark Plug Div., General Motors Corp., contain nearly 8 pct cobalt, chromium and molybdenum plus 1.05 to 1.50 pct C. Some of the speedometer magnets made by AC contain more than 40 pct alloy.

As indicated by their composition, magnet steels are brittle. As rolled hardness is in the range Rc 50 to 60, annealing treatments cannot be used. Heating is necessary to facilitate processing—yet the mis-application of heat—or even repeated application of heat—may affect magnetic strength adversely.

As a matter of fact, the most important metallurgical characteristic of magnet steels is probably their sensitivity to heating. Magnet steel that is overheated may lose its ability to become magnetized. Magnet steel that is underheated may also fail to develop adequate magnetic strength. Close control of quenching is necessary since sizeable fluctuations in the amount of retained austenite may result in too much variation in magnetic properties.

Generally speaking, the less retained austen-

ite, the better the magnetic properties. Holding at subzero temperatures reduces the amount of retained austenite—which explains the use of cold treatment by AC Spark Plug Div. This treatment is employed to minimize variations in the magnetic strength of the tiny magnets that are the very heart of a modern automobile speedometer.

Critical handling characteristics have induced many U. S. producers to use cast magnets rather than attempt to form a magnet from sensitive rolled steel. However, ability to use efficiently modern, high production fully automatic heating, forming and oil quenching at AC—plus automatic handling of batch loads during grinding and inspection—have more than justified the use of relatively expensive wrought steel.

Bars are nickel brazed

Magnet steel is purchased in 16 ft lengths. To facilitate handling and welding, 4 to 6 bars are inserted in a tube. Bars are joined together by nickel brazing. A resistance welder is used for this operation.

After welding, a metal clip is placed over the weld to support the newly formed joint. After joining, bars move through a large circle of tubing leading to an automatic heating, cut-off and forming machine. The protective clip is



HIGHLY ALLOYED magnet steel in 16-ft lengths is joined together by nickel brazing prior to processing. A resistance welder is used.



AUTOMATIC heating, cutoff and forming press cuts bars to length, pierces and forms magnet. A standard slide feeds stock into die.

removed automatically just before the endless bar of magnet steel enters the high frequency heating coil.

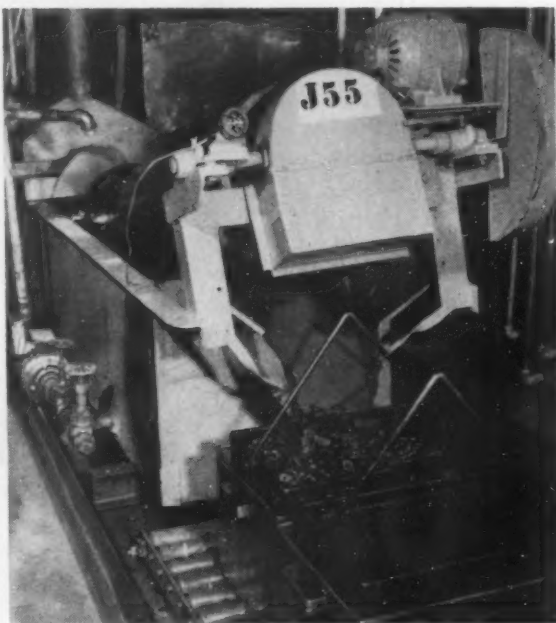
Designed and built by AC, the electrical induction heater heats a strip approximately 18 in. long as the bar moves toward the cut-off machine. A standard slide feeder, timed to the speed of the press, feeds stock into a 75 ton Verson press.

When sufficient heated stock is available, this amount is cut off. Simultaneously, a piercing tool makes a hole in the center of the heated bar. Temperature must be carefully controlled during this operation. AC holds this temperature in the range 1600° to 1625°F for the low alloy material. Somewhat higher temperatures must be used for grades containing more alloy. The temperature chosen must be sufficiently high to allow for any cooling that may occur during the processing cycle prior to oil quenching.

Pieces ejected automatically

Following the cut-off-and-pierce operation, the pierced blank is ejected from the die cavity. The piece then slides by gravity to a second die where the two ends of the blank are turned up simultaneously to form the "legs" of the magnet. This is a critical operation. Bars are carefully sorted by size prior to processing to minimize any variation at this point. Bar thickness must be held within ± 0.005 in.

After forming, pieces are again automatically ejected by an air jet which permits them to fall automatically into a hot oil quenching bath containing a rotating cylinder set at an angle in the bath. Jet streams of oil strike the piece as it descends into the oil bath, assuring a vigorous quench. Quenching oil is heated to 110°F. Since the heating temperature, time of temperature and the velocity and temperature of



HOT OIL quenching at 110°F is used. The rotation cylinder shown above deposits the pierced and formed magnets in basket.

the oil may affect the amount of retained austenite, each operation is closely controlled.

The rotating cylinder which extends into the oil bath is equipped with baffles which bring the quenched pieces out of the oil bath automatically and deposit them in a tote basket.

Quenched magnets are washed and then left in a Webber Deep Freeze cabinet for approximately 8 hr. Temperature of the cabinet is held constantly at -120°F during this period. There are several reasons for using this cold treatment:

1. Promote uniformity of the product.

"Stress relieving at 200° F after cold treating further increases magnet stability . . ."

2. Increase the amount of austenite that is converted into martensite.

3. Increase stability of the magnets—particularly for subsequent operations in service at low temperatures.

Following the cold treatment, magnets are stress relieved at 200°F. This is an additional stabilizing treatment. Cracking during subsequent grinding is also minimized.

After washing and tumbling to remove burrs, legs are ground to required height on a rotary Hanchett grinder having a magnetic table. This grinder is equipped with a Syntron loader which feeds parts automatically. A coil demagnetizes the pieces as they leave the grinder.

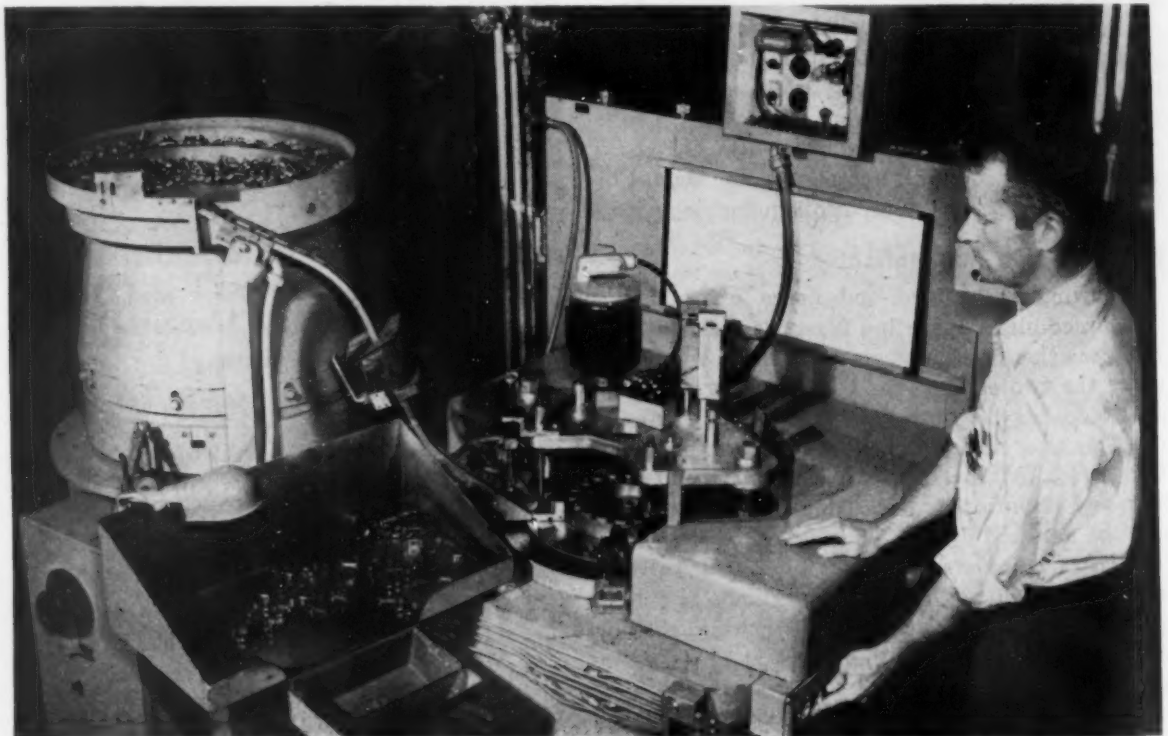
A number of inspection operations at AC have been combined into a single, fully automatic machine. Unmagnetized parts are fed automatically onto a dial table. The part is magnetized during the inspection operation. Ingenious Go and No Go gages are employed to check the following: (1) Hole size and location, (2) Oversize O D, (3) Undersize O D, (4) Leg height low, (5) Leg height high, (6) Low magnetic strength. Optimum inspection rate is 2000 pieces per hr. Master parts, properly identified,



DEEP FREEZING for 8 hr promotes uniformity of magnets, increases the amount of austenite converted to martensite and assures stability.

are sent through the machine periodically to be sure satisfactory parts are not rejected.

The inspection machine which rejects unsatisfactory parts automatically is shown in an accompanying illustration. The machine was designed by AC tool engineers and is typical of many fully automatic inspection operations in use throughout the plant.



GAGING MACHINE automatically handles 2000 pieces per hr. The device checks all critical dimensions as well as magnetic strength. Machine was designed by AC tool engineers.

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Technical Literature

New Bulletins

Baking

Brochure gives data on dielectric sand core baking equipment. This form of electronic heat offers economic and qualitative advantages. New Thermex tunnel equipment permits continuous mass production of materials that could not previously be heated by high frequency energy. Baking time for a typical core is said to have been slashed from 2 hours to less than 5 minutes. *Girdler Corp.*

For free copy circle No. 1 on postcard, p. 165.

Bearings

New pamphlet contains information on sealed full type roller bearings which provide low cost sealing for many applications where sealed needle type bearings were considered too expensive. Series incorporates seals functionally equivalent to standard commercial lip type seals. *McGill Mfg. Co., Inc.*

For free copy circle No. 2 on postcard, p. 165.

Furnaces

Pamphlet gives information on metal melting furnaces for nonferrous alloys. High grade fire brick or silicon carbide preburned linings are furnished. Both are well insulated and are 7 in. thick. The furnaces can be supplied with either gas or oil burners and, when specified, made interchangeable from one fuel to the other. *Campbell-Hausfeld Co.*

For free copy circle No. 3 on postcard, p. 165.

Compressors

Booklet presents M-Line of compressors. Design features include stronger construction and precision bearings for better load distribution. A motor-driven positive displacement gear-type lubricating oil pump, independent of the compressor drive, insures complete bearing lubrication. Compressor units can be applied to any prime mover, and adaptations are engineered according to customer requirements. *Cooper-Bessemer Corp.*

For free copy circle No. 4 on postcard, p. 165.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 165.

Equipment

Brochure features information on new four-high mills and a 30-in. foil slitter. Among the advantages claimed for the slitter are substantially higher speed, improved sheet control, rapid mounting of letoff and windup arbors on cone supports, and a simplified method of threading the sheet. The specially designed, high-speed, four-high mill is capable of handling a heavy share of the primary reductions of aluminum down to a gage as low as .001 in. *Farrel-Birmingham Co., Inc.*

For free copy circle No. 5 on postcard, p. 165.

Gages

Adjustable dial indicator comparators to provide flexibility in measuring large inside or outside diameters are described in a 4-p. bulletin. These gages have built-in radial rests to assure positive location on either the curved surface of a shaft or the flat rest of a master. Also described is the Setmaster to be used as the setting master for these dial gages. *Boice Mfg. Co., Inc.*

For free copy circle No. 6 on postcard, p. 165.

Pumps

Booklet gives uses of Myers Centri-Thrift pumps. Built for continuous duty, they will develop heads up to 92 ft. The pumps have closed bronze impellers and are fitted with rotary seals to eliminate leakage and simplify replacement. *F. E. Myers & Bro. Co.*

For free copy circle No. 7 on postcard, p. 165.

Switchgears

Booklet gives information and illustrations of switchgears with special attention to economy factors. Savings are made through reduced building costs, elimination of hazards and costly damage to equipment, provision for future growth requirements and accessibility of all components. Also described is the company's line of steel enclosures for circuit breakers and other protective devices. *I-T-E Circuit Breaker Co.*

For free copy circle No. 8 on postcard, p. 165.

Polishing

An informative bulletin on the theory and practice of electrolytic polishing of metallurgical samples has just been issued. The bulletin includes microphotographs of common metal samples and contains outlines for their preparation. Included is a diagram of the Buehler polishing cell and information on the limitations of electrolytic polishing. *Buehler Ltd.*

For free copy circle No. 9 on postcard, p. 165.

Steel wire

Pamphlet outlines uses for stainless steel wire. It can be twisted into the strongest rope, braided into armored or shielding cable, drawn and formed into long-lasting scouring pads and brushes, or shaped into shock absorbers. Stainless steel can be partially oxidized and used as an abrasive in forming extremely accurate short radius grooves in metal blocks. *Fort Wayne Metals Inc.*

For free copy circle No. 10 on postcard, p. 165.

Fittings

Brochure describes new wire rope choker sling fitting. It shows typical applications for which the new fitting is suitable, such as handling lumber, rods and heavy pipes. There are illustrations and close-up views of the optional locking shoe device which keeps non-rigid loads tightly bound. *Electroline Co.*

For free copy circle No. 11 on postcard, p. 165.

Turn Page

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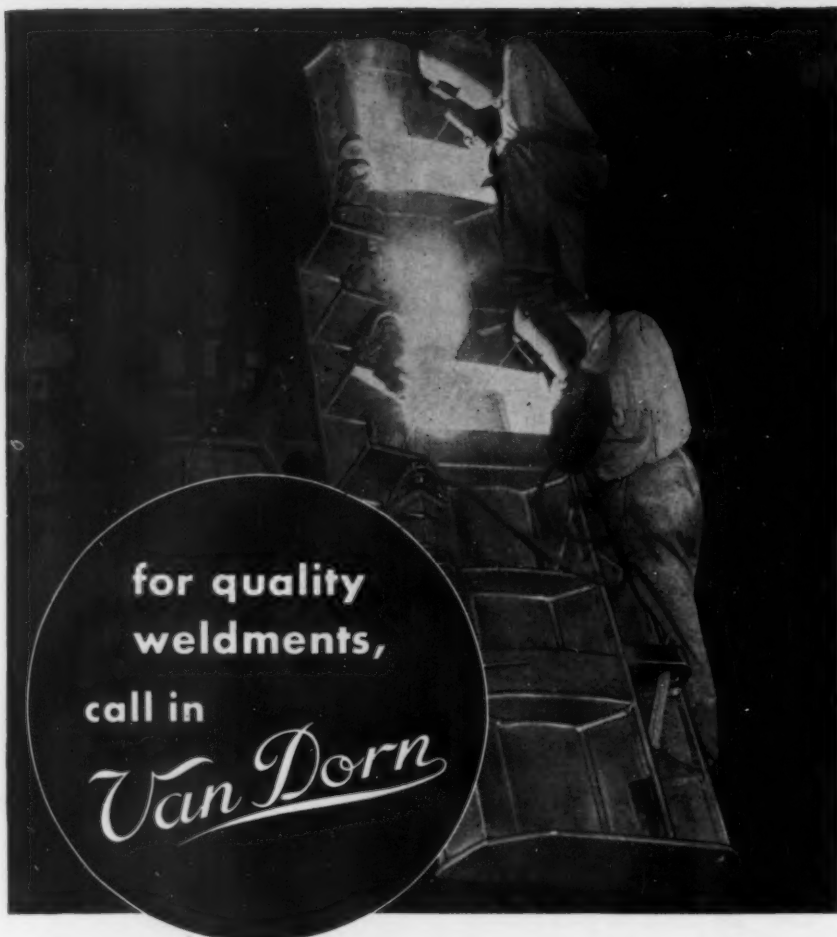
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Free Technical Literature

Continued

Tin

Utility of tin in industry and value in product design are shown in new booklet. Publication points up the fact that research is opening up new areas in which tin plays a vital role in the improvement of products. In pictures and text the booklet studies the use of tin in containers, engines and vehicles, bearings, improvement of alloys, and in chemistry. *Malayan Tin Bureau.*

For free copy circle No. 12 on postcard, p. 145.

Insulation

New, revised, 20-p. reference manual on lagging adhesives, sealers, surface coatings, fire retardant mastics and vapor barriers is now available. The manual is a comprehensive, indexed grouping of Foster manufactured products for use with all types of insulation in the marine and industrial field. Complete technical product data is included. *Benjamin Foster Co.*

For free copy circle No. 13 on postcard, p. 145.

Controls

Illustrations and information are given concerning auto-pneumatic control for governing temperature, liquid level, pressure and other processes. The Reeves auto-pneumatic control operates through a cam control which matches the natural characteristics of the Reeves Monodrive and automatically compensates for any variation from linear output speeds. *Reeves Pulley Co.*

For free copy circle No. 14 on postcard, p. 145.

Communications

Folder gives information on direct voice communication. Designed for heavy industry service, the M. S. A. Telecrane provides direct communication between personnel at various stations throughout a plant, between base stations and mobile units and between operators of mobile units such as cranes, ore and coal bridges, and boat unloaders. *Mine Safety Appliances Co.*

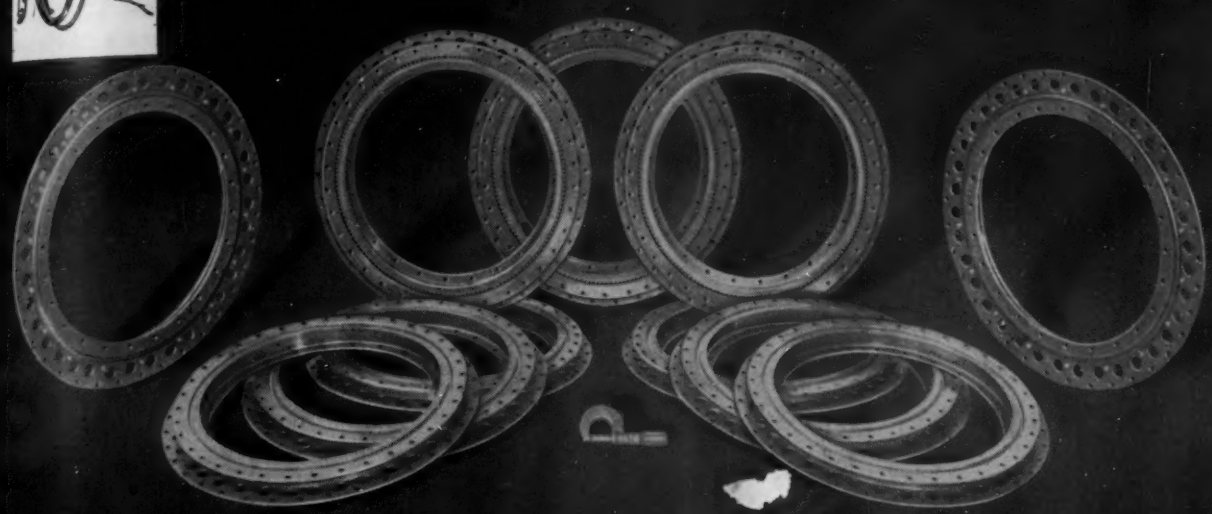
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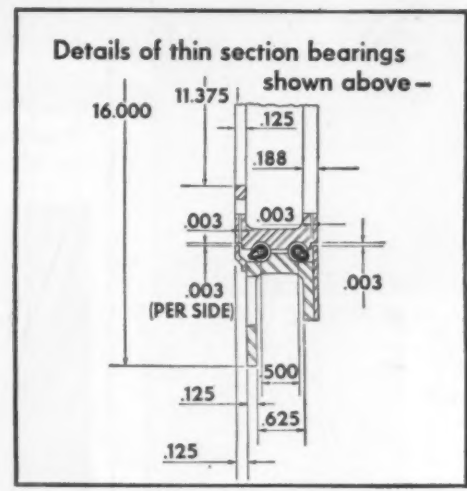
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Technical Briefs

Engineering

Methods:

Wire brush removes chips from broach, lengthens tool life.

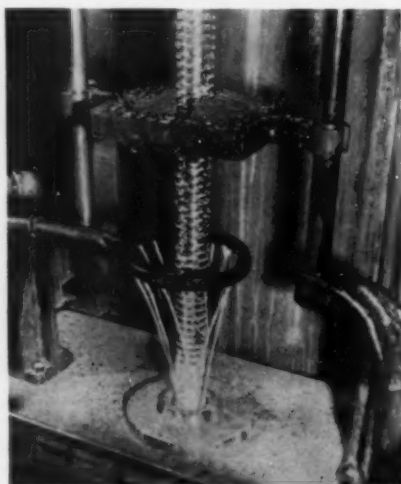
A simple brushing operation now in use at International Harvester Co.'s Louisville Works automatically removes the chips from the broach bar cutting internal splines in steel bull gear forgings. This brushing operation has reduced part rejections by 12 pct and has considerably increased broach life.

Prior to adapting brushes to this job the broaching bar would quickly load up with chips causing rough and inaccurate splines. The machine operator was paid on a piece basis, and received no penalty for rejects. The net effect was a 12 pct rejection rate because of "run-outs," the tendency of the gear to runout of alignment with the splines.

Lengthens Broach Life

Brushing has successfully solved this problem, and, in addition, has helped double the life of the broaching bar before it must be removed for resharpening, in itself a costly operation.

A VMS-10-48 Pull Down Colonial Broach machine is used, adapted with a special holder mounting four brushes. The four brushes are so mounted around the broaching bar that the bar is



Brush removes chips . . .

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 137. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

surrounded by wire bristles. The brush bristles are 0.005 in. steel wire, 2 in. long, used in 3-in. strips. Width of the brush face is one-quarter inch. This installation was developed by International Harvester with the cooperation of the Osborn Mfg. Co., manufacturers and designers of power brushes.

Maintenance:

Radiographic pictures pinpoint sway in big ore bridge.

Radiographic pictures recently helped spot a source of sway in the huge ore bridge of the Granite City Steel Co. The method eliminated the need for the expensive job of dismantling part of the bridge to find a structural defect.

Engineers had noticed some movement at connections between the top girders and vertical members of the pier leg of the bridge.

The company called in St. Louis Testing Laboratories. A small capsule of radioactive cobalt 60 was brought to the ore bridge in an 800-lb lead safe. The capsule was suspended from a chalk line opposite the point where the movement or sway had developed.

Radioactive rays penetrated the layers of steel. On the opposite side of the steel from the capsule of Cobalt 60 was a film to receive the ray picture. The film showed movement or sway in the ore bridge was a result of certain rivets being loose. It was a comparatively simple matter to replace the loose, 3/4-in. rivets with new 7/8-in. rivets.

Power:

Ribbed belt drive improves power transmission.

Demands of the metalworking industry for higher speeds in machining operations and greater power for handling of tougher metals have recently focused attention on the need for improved power and power transmission devices.

A Single, Ribbed Belt

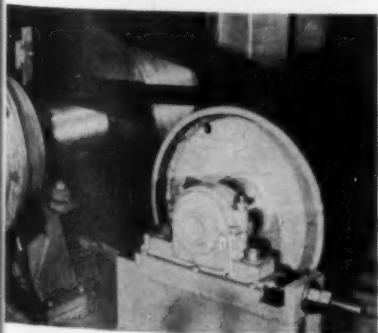
Some of these needs may be answered in part with a new type ribbed belt drive. The new drive, called Poly-V, is made up of the usual belt and sheave combination, but design of both is radically different from any existing belt drive.

The belt is flat with a ribbed traction surface molded around its inside circumference and has an uninterrupted strength member of synthetic cords across its entire width. The sheave for the new drive is machined with parallel V-shaped grooves around the outside surface.

How It Works

When belt and sheave are fitted together they mate precisely, producing uninterrupted contact between belt and sheave over the entire width of the drive. This gives twice the contact area of the usual multiple V-belt drive. The new single belt also eliminates the problem of matching separate V-belts to fit a drive, and cuts the need for a large belt inventory.

The new drive is the result of 6 years development by Raybestos-



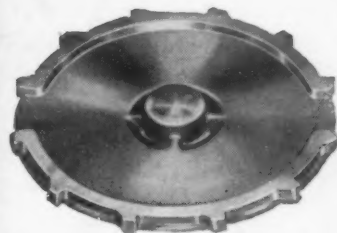
Belt ribbed inside . . .
Turn Page

MUELLER BRASS CO. forgings* contribute to the efficiency of this modern waste disposal unit

***MUELLER BRASS CO. facilities include: designing, die-making, forging, tooling, machining, polishing, plating and assembly**



Three Mueller Brass Co. forgings play an important part in the fine operating performance of this modern waste disposal unit made by the Eureka-Williams Co., Division of the Henney Motor Co., Inc. This unit does a speedy and thoroughly effective job of pulverizing garbage and has made life easier for American housewives. The impeller disposer that chops up the waste food in the disposal unit, the disposer cover and the sink mounting flange are all forged by the Mueller Brass Co. This is another outstanding instance where Mueller Brass Co. forgings have improved product performance and cut costs. High quality forgings can be produced from standard and special brass, bronze and aluminum alloys. And in addition, the Mueller Brass Co. offers complete service ranging from product design to finished part . . . Write today for complete information and new 32 page forgings handbook.




1. Sink mounting flange, forged, machined, nickel and chrome plated by Mueller Brass Co.
2. Machined and finished disposer cover forging.
3. Cutting side of impeller disposer forged from 600 series bearing bronze.
4. Reverse side of impeller disposer.

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Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.



—Technical Briefs—

Manhattan, Inc., and works on a different principle than the conventional V-belt, which relies on wedging action for pulling power.

Since rubber is incompressible, but yet flowable the V's on the Poly-V belt completely fill the sheave grooves giving positive grip across the entire drive when the belt is under tension. This allows the new drive to deliver 50 pct more power with the same width sheave, or the same horsepower with 1/3 narrower sheaves.

Face Pressure Reduced

Basic design features of the ribbed belt drive reduce face pressure on the belt by 50 pct. With less face pressure, there is less wear and, according to the belt's maker, much longer life for belts and sheaves.

There are only two cross section sizes. These cross sections meet all normal drive requirements from 3-in. pitch diameter sheaves and 50-in. belt pitch length upwards.

Has Longer Life

Because of the unusual belt and sheave design, sudden shock loads cannot pull the belt further down into the sheave grooves, changing the speed ratio of the drive. There is no space between the bottom of the belt and the sheave. This eliminates worn shoulders in sheave grooves and adds life to the sheave.

In 1951 Raybestos-Manhattan, Inc., was handed an urgent development project to test its sintered metal clutch facings. To do this, the test machine would have to reach 4500 rpm at 250 hp. The available friction material test machine had a maximum output of 1500 rpm.

Space required for a speed-up drive with a gear box—or any ordinary belt drive—could not be provided in this machine. The solution lay in a jackshaft drive that raised the rpm from 1500 to 4000, without changing the shaft center location.

This was accomplished with two 10-in. wide drives on 25-in. jackshaft centers. The secondary drive reached a belt speed of 11,000 fpm over an 11-in. driven sheave from rest in 5 minute continuous cycling.

Automation:

Transfer machine speeds production of auto parts.

A specially designed, Canadian-made transfer machine is being used to speed production of ball joints for front end suspension at the Windsor plant of Ford Motor Co. of Canada.

Built in Toronto by Modern Tool Works, Ltd., the machine performs boring, facing, chamfering, rough and finish forming, drilling, spotfacing, reaming and tapping.

Designed Around Islands

Fifteen work stations are designed around five "islands." Each consists of a rigid casting housing the indexing, locating and clamping mechanisms. To the top of each section is fastened the hardened dovetail ways on which the fixtures slide.

The five sections are spaced to conform to the requirements of the machine. The ways bridge the gaps between all sections and all assemblies are identical carrying their own portion of the transfer bar.

The cam bar for actuating the locating pins is treated in the same manner. With the sections then properly spaced and interlocked by the ways, the portions of transfer and cam bar are joined forming the main structure of the machine.

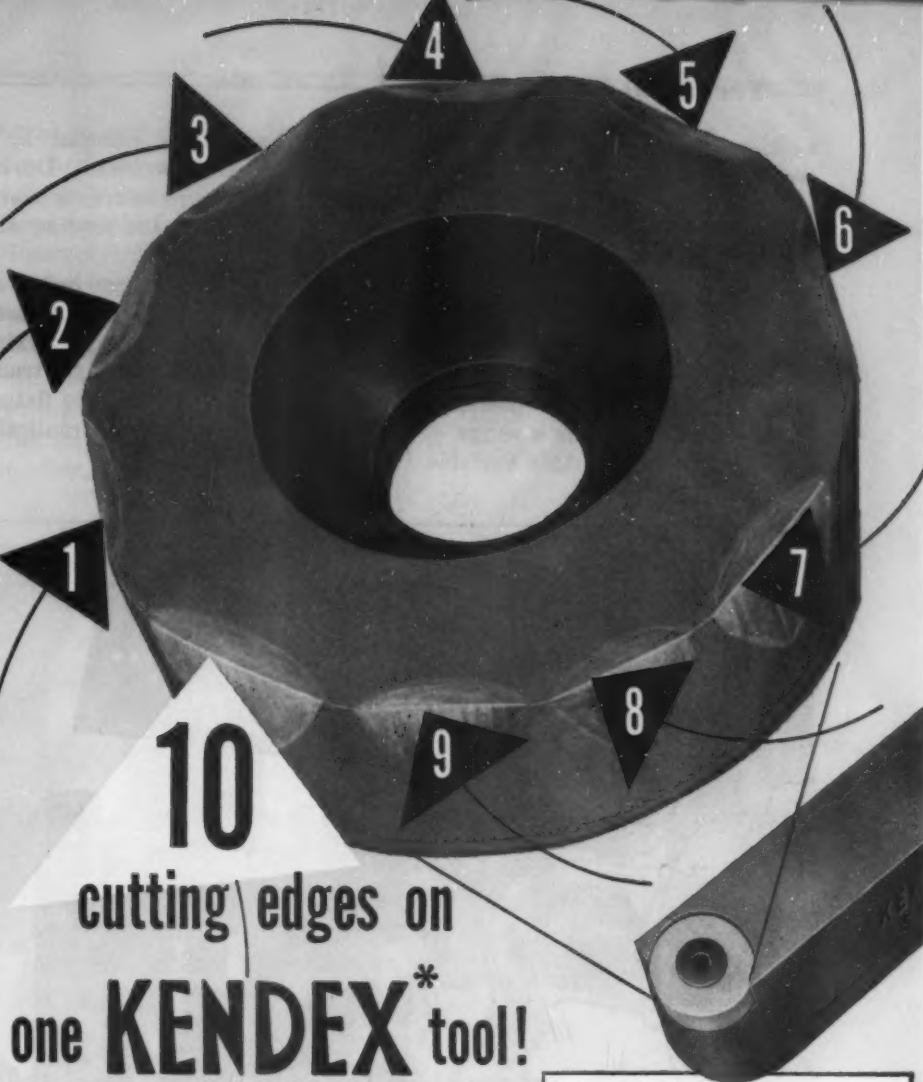
Can Add Stations

This unit type construction offers accessibility and flexibility. Since each side of the "island"



Transfer machine setup ...

Turn Page



10 cutting edges on one KENDEX* tool!

No tool grinding expense and *minimum* machine down time for tool changing—these are the advantages you obtain from multiple-edge Kendex "throw-away" insert tools. For example:

A Kendex round insert, used to bore 2½" cast iron staters, machined 300 pieces before one cutting edge dulled. Then, without removing the shank from the boring bar, the "button" was revolved to a new cutting position, until 3,000 staters were machined with the insert's 10 cutting edges. Best previous performance, by a conventional brazed tool, was 400 staters per tool grind.

Kendex precision-ground buttons have Kennametal's high wear-resistance, for long life. Screw-mounted, they can be rotated in seconds to new cutting positions without removing or resetting the tool holder ... a great time-saving feature. When all cutting edges are used, the insert is thrown away—replacement cost is slight compared to that of regrinding.

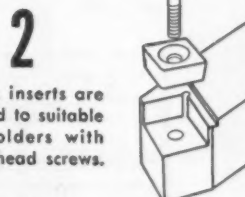
Only Kennametal makes Kendex "throw-away" inserts. Ask your nearest Kennametal tool representative to help you apply this cost-saving tooling to suitable operations in your plant. Kennametal Inc., Latrobe, Pa.

*Registered Trade-Marks

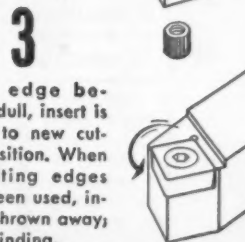
How KENDEX* Works



1 Hard, strong, wear-resistant Kennametal is molded into square, round, or triangular Kendex inserts, which are precision ground.



2 Kendex inserts are mounted to suitable tool holders with socket head screws.



3 When edge becomes dull, insert is turned to new cutting position. When all cutting edges have been used, insert is thrown away; no regrinding.

KENNAMETAL

CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY

A-8

SALES OFFICES IN PRINCIPAL CITIES



Technical Briefs

casting is completely machined, work stations may be located at any position on these faces.

Additional work stations may be added wherever an idle station has been provided. Or, complete section assemblies may be added or removed as required.

Operating units are hydraulically and individually powered. Pick off gears, provide a range of speeds. Feed is infinitely variable.

Components are clamped by a power operated wrench. During loading the return conveyor moves a fixture towards the loading station.

When the conveyor halts all work holding units are automatically indexed to the next working station. At completion of the transfer, locating pins enter the fixture and all fixtures are hydraulically clamped.

Units then advance, perform their operation, and return. The transfer bar returns during the work cycle ready to pick up the fixtures again for the next index. When the work holding units are indexed a station is left idle immediately adjacent to the loading station.

Use Assist Cylinder

The operator now moves the loaded fixture into this space by means of an assist cylinder. He then presses the cycle start button and the conveyor immediately delivers the next fixture onto the loading station and the cycle is complete. As each transfer is completed a fixture is advanced into position on the return conveyor to be carried back to the loading station. Each fixture in turn passes through a chip removal station where the cuttings and coolant are automatically removed by blasts of compressed air.

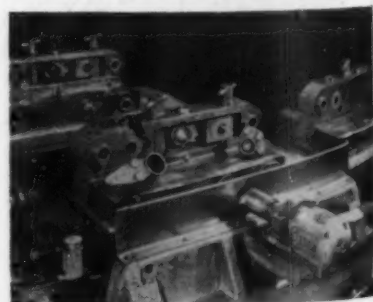
Chips Handling

Chips at the work stations are channeled into a drag type chip conveyor which carries them to the far end of the machine where they are deposited.

Indexing, locating and clamping are all hydraulically operated and interlocked electrically. All units must perform their operations before an index can take place and all fixtures must be properly located and clamped before any machining can be done.

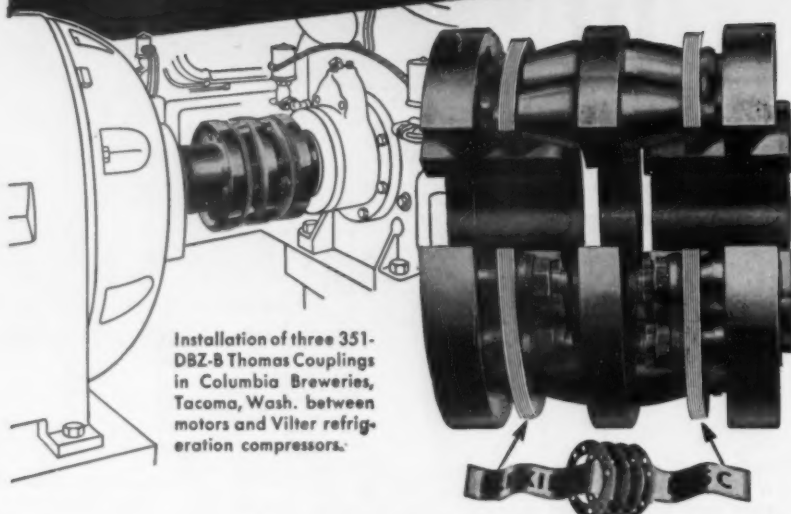
Lights Signal Failure

Failure of any one function of the cycle is indicated by a panel system of signal lights. If the machine is stopped part way through an automatic cycle, all work units automatically back out of the work before coming to a complete stop.



For making ball joints...

THOMAS FLEXIBLE COUPLINGS... for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.



Write for our new Engineering Catalog No. 51A



THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

Metallurgy:

Control methods better structure of gray cast irons.

Modern techniques permit better control of the structure of gray cast iron and recovery of chromium from discard slags in steelmaking, according to H. H. Wilder of the Vanadium Corp. of America.

While certain qualities of gray cast iron may be enhanced by adding small amounts of either of two types of inoculants, increased quantities of inoculants are not proportionately more beneficial.

Use of Inoculants

Graphitizing inoculants containing silicon, calcium, titanium, and zirconium are helpful with medium to thin sections where tendencies to crystallize, or produce white iron, are more pronounced.

Stabilizing inoculants, such as silicon, zirconium, chromium, and manganese, are said to be helpful in reducing section sensitivity and in offsetting differences in the cooling rates of light and heavy sections.

Inoculation is a method of developing the optimum structure of which an already good iron is capable.

Chromium Conservation

Three methods of achieving chromium conservation have been outlined by Vanadium's Chief Metallurgical Engineer, T. W. Merrill, and Service Engineer F. St. Vincent. They report that the loss of chromium units in steelmaking discard slag represents a waste not only of dollars, but also of irreplaceable natural resources and of strategic materials now in short supply.

They explain techniques said to permit conversion to saleable products of more than 90 pct of the chromium and to reduce unavoidable loss to less than one-half of one pct.

Thorough Mixing

Most practicable method is described as the thorough mixing, by repouring, of low-carbon ferro-

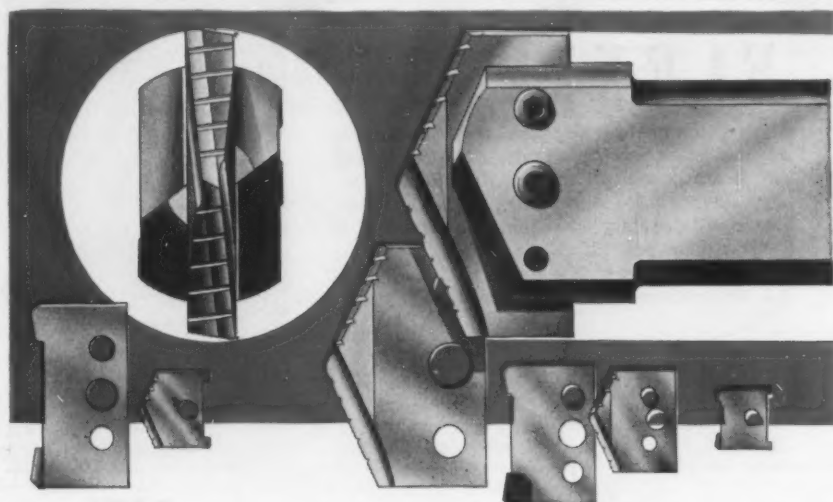
chromium and silicon so that more than half the chromium units in slag are reduced to metal and the silicon largely is oxidized.

Recovery is possible also by transferring the molten slag to a separate furnace unit for treatment with reducing agents. A third method comprises direct-treating with a reducer and recovering the high-chromium, high-silicon alloy.

The repouring method is commended as generally applicable to steelmaking processes, although the other suggestions are viewed as being worthy of consideration.

That under ordinary conditions the recovery of chromium from steelmaking slags is possible and can be done most advantageously by the method referred to as repouring, the engineers stated in the *Vancoram Review*.

Turn Page



Drill Large Holes from the Solid with Interchangeable Spade Drills

Made in 256 cutter sizes, 1 to 5 inch diameter, in steps of 1/16, Conner type Spade Drills drill the required diameter in one operation, need no retracting to clear them of chips. Only eight sizes of holders are needed to handle all cutter sizes.

For general purpose work and in the Tool Room, use the cutter and holder assembly shown above. It is a rugged tool of great rigidity, recommended for large holes of medium depth.

For Production Drilling (for repetitive work), and for the somewhat deeper holes, use Conner type Oil Hole Holders designed for easy coolant flow and fast chip expulsion.



Send for Catalog and Price List

For Boring: Core Drill Cutters, for semi-finishing of cored and drilled holes, are made in the same 256 sizes, to fit the same spade drill holders.

The Gairing Tool Company is now the exclusive manufacturer of the Spade and Core Drills, both standard and special, formerly made by the Conner Tool & Cutter Company.



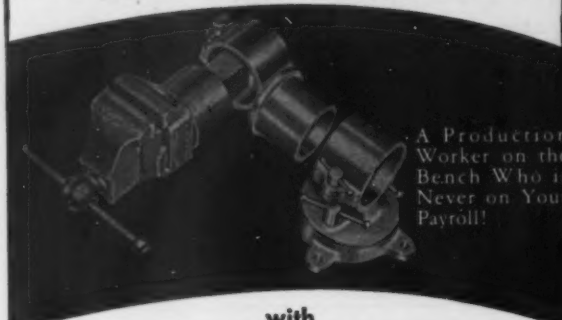
In Canada: A. C. Wickman (Canada) Ltd., Queensway, Toronto 14

The GAIRING Tool Company

21224 Hoover Road

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Cut Production Time and Costs



A Production Worker on the Bench Who is Never on Your Payroll!

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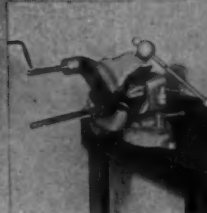
A revolutionary development that saves time, labor and fatigue. Provides complete rotation of 360° in any direction. Positions work to the operator, saving time, labor and physical fatigue. Flexivise is exactly what the name implies; a flexible vise providing a greater range and greater efficiency. 4" jaw width, 5½" jaw opening. Write or wire now for complete information.

FLEXIVISE COMPANY

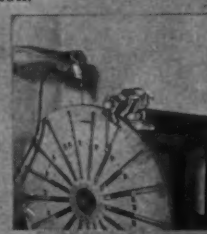
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Special FlexiSleeve provides a vertical rotation.



Work can be rotated a full 360° and locked in any position.



Large unwieldy pieces can be held securely by Flexivise.

adds a magic touch



Hendrick Ornametal



More and more metal fabricators are realizing the sales benefits that stem from using Hendrick Ornametal in their product design. Whether you require perforated metal for radiator enclosures, stove panels, kitchen cabinets, clothes and broom closets, lockers or similar applications, you can be certain there's a Hendrick Ornametal design suited for your exact needs.

Lightweight and supplied in special bright finish Hendrick Ornametal is made of cold rolled steel suitable for painting or plating. For more complete details, contact Hendrick direct.

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tectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

—Technical Briefs—

New Books:

Welding, forging, spectro-
graphy discussed in new books.

Metallurgical aspects of welding, and basic techniques used in preparing metal and alloy specimens for study are subjects of recently published books.

"Metallurgy of Welding," by W. H. Bruckner. Concerned mainly with welding from the metallurgical viewpoint. Background material is supplied on specifications of metals for welding, the design of a welded joint, the compounding of a coating for a metallic electrode used in welding and many other considerations. Pitman Publishing Corp., 2 West 45th St., New York 36. \$6.00. 290 p.

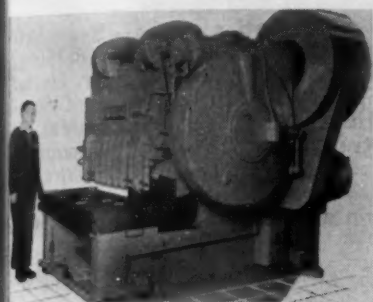
"Procedure in Experimental Metallurgy," by A. U. Seybolt and J. E. Burke. Primary aim is to describe most of the important laboratory techniques which are now used in preparation of metals and alloy specimens for further study. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. \$7.00. 340 p.

"The Closed Die Forging Process," by P. E. Kyle. Contains brief descriptions of the essential steps in producing drop forgings and discusses some uses to which closed die forgings can be adapted. Serves as valuable supplement to textbooks in machine design. The Macmillan Co., 60 Fifth Ave., New York 11. \$1.50. 140 p.

"Methods For Emission Spectrochemical Analysis," sponsored by ASTM Committee E-2 on Emission Spectroscopy. First extensive compilation on emission spectrochemical methods. In addition to suggested practices and suggested methods, book lists three tentative methods prepared by the committee, one tentative method of flame photometry for alkalis in cement, and a report on suggested nomenclature. American Society for Testing Materials, 1916 Race St., Philadelphia 3. \$5.15 (cloth-bound), \$4.50 (paper cover). 320 p.

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 165 or 166.

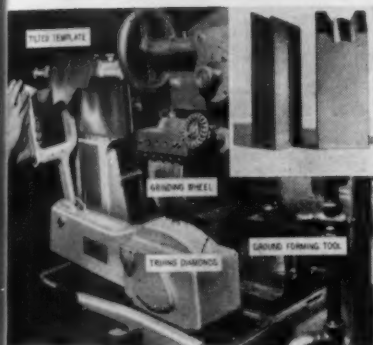


New capacity shear cuts 1 1/2-in. thick mild steel

This all steel shear is equipped with a front controlled power operated back gage, having a 48-in. back gage range. The back gage angle itself is hinged to allow the passage of plates longer than the back gage range of the machine. The machine is made of all steel rolled plate and has an interlocked

construction. It is powered by a silent worm gear drive, has a hardened multiple jaw clutch, hydraulic holdowns, light beam shearing gage, ball transfers in the table for easy feeding of heavy plate, safety friction to the flywheel and slitting adjustments. *Cincinnati Shaper Co.*

For more data circle No. 29 on postcard, p. 165.



Cutter relief angle grinding simplified

New Diaform wheel forming attachment is designed to simplify the grinding of relief angles on forming tools. Available in three models, it works on the pantograph principle. The attachment eliminates need of distorted template projection drawings and length calculations in order to retain the true form of the cutting edge on a form-

ing tool when grinding the required relief. With the attachment, the wheel is form-trued by lightly traversing the tracing bar over the profile of the tilted and swiveled template. Path of the tracer is transmitted at a 5:1 or 10:1 reduction ratio to the truing diamonds. *Pratt & Whitney.*

For more data circle No. 30 on postcard, p. 165.



Grab adds versatility to lift truck

Special grab and manipulator makes the versatile fork lift truck even more versatile. Designed to handle hot forgings and billets, the grab can be attached to a fork lifter to convert it into a relatively inexpensive, light duty manipulator. It handles loads up to 1000 lb, rotating work 360°

clockwise or counter clockwise for forging presses or for loading or unloading heat treating furnaces. Clamping mechanism and rotating base are hydraulically operated for fast, positive positioning at any height. Clamping jaws can vary somewhat. *Allied Sales & Mfg. Co.*

For more data circle No. 31 on postcard, p. 165.



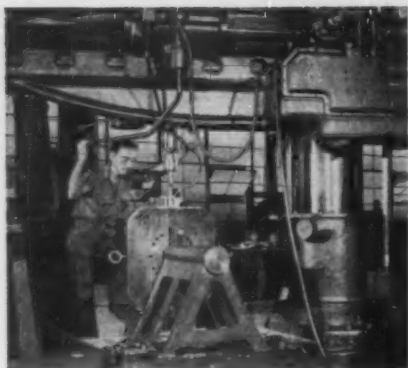
Small milling machine for small precision parts

New high rpm universal bench mill has the speed, accuracy and power needed to machine to tolerances of 0.0001 in., small parts made of steel, brass, aluminum, plastics. The machine tool is small, handy and sensitive to allow proper control and handling of small workpieces. Due to the small diameter cutting tools used, high spindle speeds to 45,000 rpm are provided, which in turn backed up by very

accurate quills and sufficient horsepower maintain such spindle speeds under production loads. This mill is fully universal. Head may be adjusted from a vertical position through 360°. Horizontal arm holding power quill may be moved through 60° from horizontal in either direction. *Precise Products Corp.*

For more data circle No. 32 on postcard, p. 165.

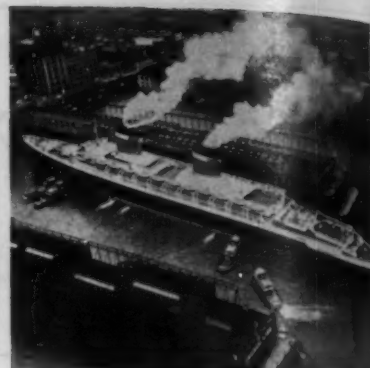
Turn Page



Tool steels—Widely used in everything from woodworking tools to high-speed machine tools, vanadium tool steels combine great mechanical strength with superior cutting ability. Containing extremely hard vanadium carbides, they effectively resist both wear and grain growth.



Forgings—For application under severe operating conditions in transportation and power equipment, crankshafts, gears, axles and other heavy-section parts are forged of vanadium steel. Inherently fine grained, vanadium steel has greater strength and toughness, allows a larger section-size to be fully hardened.



Plates and shapes—For high strength and superior weldability, designers of the U. S. liner, *United States*, specified hull plates of vanadium steel. Besides increasing strength and ductility, vanadium decreases any tendency toward undesirable brittleness in the welded zones even at subzero temperatures.



Castings—Crawler shoes for power shovels, bucket teeth for dredging machinery, truck frames for railway cars—all have increased strength, greater resistance to shock and fatigue when cast from vanadium steel. These castings also have excellent machining qualities and can be heat treated to a wide range of mechanical properties.

Make it better...make it alloy

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MAKE IT ALLOY

*Make it VANADIUM STEEL...
investigate the possibilities in
your application*

VANCORAM VANADIUM ALLOYS

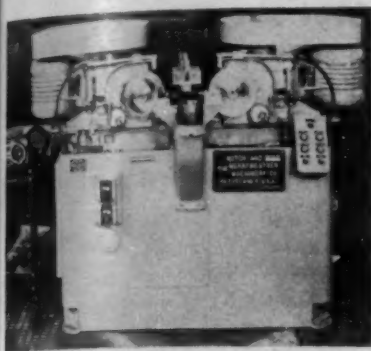
*... there's a grade available
for every vanadium steel and iron application*

Iron Foundry Grade	For improvement of the physical properties of iron.
Grade A (Open Hearth)	For low-vanadium steels and vanadium cast irons.
Grade B (Crucible)	For tool steels and other high-vanadium steels requiring a limited silicon addition.
Grade C (Primes)	For making the highest vanadium and the lowest silicon addition to tool steels.
Vanadium Metal (90% Grade)	For special iron-free (non-ferrous) or low-iron alloys, or for low-impurity ferrous alloys.
Vanadium Pentoxide, Tech.	A source of vanadium in basic electric-furnace steels. A base for numerous chemical compounds.

The finest alloy steels are made with Vancoram ferro alloys.

New Equipment

Continued



Machine saw-cuts cap from connecting rod

Connecting rod forgings for automotive truck and diesel use are most commonly made as one-piece forgings. After partially machining them in this state, the cap is split from the shank of the connecting rod, then reassembled by bolts for final machining operations. A new machine has been produced that accurately saw-cuts the cap

from the connecting rod. Its right-hand and left-hand sawing heads carrying high speed steel triple-chip circular saw blades are fed simultaneously from each side of the forging to part the cap from the shank. Saw heads are each driven by 2 hp motors. *Motch & Merryweather Machinery Co.*

For more data circle No. 33 on postcard, p. 165.



Roller-lapping machine laps plugs, rods, pins

With a new roller-lapping machine any shop personnel, after a few minutes of instruction, can lap metal, glass, or plastic plugs, rods or pins from $\frac{1}{8}$ to 6 in. diam quickly and easily. Finishes as fine as 2 rms or less may be obtained. The equipment consists essentially

of two precision-ground cast iron rollers, with shafts extending on both sides and revolving in adjustable bearings. Rollers are parallel, 12 in. long x 3 and 6 in. diam. The larger roller has dual internal air chambers for keeping temperature of the work down. *Spitfire Tool Co.*

For more data circle No. 34 on postcard, p. 165.

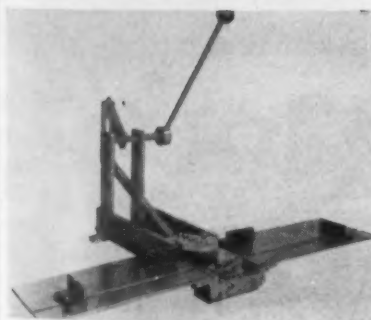


Backstand idler for heavy-duty and light jobs

The 61 universal backstand idler is a new, low cost attachment for all types of wall, bench and floor, coated abrasive backstand grinding and polishing operations. It permits belts of the same length to be employed with contact wheels of various diameters. Varying widths of belts can be used, ranging from $\frac{1}{2}$ to 8 in., due to a belt

tracking mechanism and highly sensitive tension adjustments. The tracking device eliminates the need for precise center alignment between idler pulley and contact wheel. Linkage-type arrangement permits finger-tip manual adjustment of tension and tracking. *Carborundum Co.*

For more data circle No. 35 on postcard, p. 165.

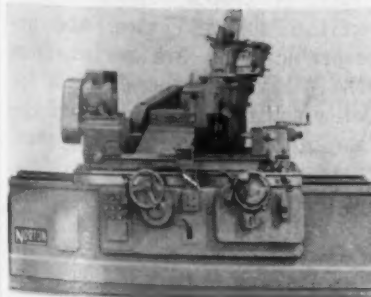


Notcher can cut 15 gage sheet metal

Wide variety of notches and other cuts in sheet metal up to 15 gage thickness can be cut on a new machine. It will cut to a length and width of 3 in., to equal a linear cut of 9 in. Ninety-degree corner cuts 3 in. long, 90° and 115° V's, corner and angular reliefs are possible. Eleven different stack head

cuts can be made using one die. Two 13-in. long steel tables are quickly positioned from a master template for making large numbers of identical cuts. Actual shearing is done by hardened and ground tool steel shear blades and dies. *U. S. Tool & Die, Inc.*

For more data circle No. 36 on postcard, p. 165.



New angular machine cuts grinding costs

The CV-4 semiautomatic angular wheel slide grinding machine rapidly grinds thrust surfaces and adjacent diameters simultaneously in a single, automatically controlled plunge grind. It cuts grinding costs by eliminating the separate operation normally necessary when similar jobs are done in conven-

tional cylindrical grinders. The machine produces a concentric grain pattern in the finish of the shoulder or thrust surface ground. Faster sizing qualities and simplified operation are built into the CV-4 angular machine. *Norton Co.*

For more data circle No. 37 on postcard, p. 165.

Turn Page



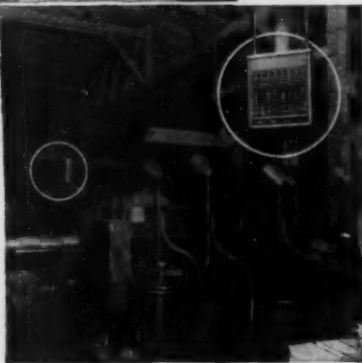
Starting with 8 Janitrol Unit Heaters in their Wirebound Box Plant in 1942 the Great Southern Box Co., Inc. found this a practical and economical answer for their heating problems. Janitrol gas units kept installation costs to a minimum . . . no costly steam pipes were needed.

Plant expansion in 1944 required 12 additional Janitrol units for the new Corrugated Section . . . and in 1946, 27 similar units were installed in their new plant in Jackson, Miss. Several units have also been installed in their Cleated Corrugated Plant in Jackson, Miss.

Mr. Olivier, said, "All of our heating requirements have been met with Janitrol Unit Heaters. There is no question that Janitrol engineering features assure long trouble-free service."

Sawdust in the air in the wooden box plant covers the Janitrol Units and makes occasional cleaning necessary—yet no maintenance problems have arisen, even under these rugged conditions!

Look into the *plus* features of gas heat with Janitrol for *your* needs!



All heating units are around the perimeter of the big 440' x 90' building.



Janitrol units in the paper box building cover eight shipping doors to provide a curtain of warm air during loading operations.



Write today for "The Business Man's Blue Book for Better Heating." It gives full details about unit heater performance and best installation practices.

Janitrol Gas-Fired
UNIT HEATERS

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makers of the famous furnaces that heat treat most of the products of big name industry

New Equipment

Continued

Foot shear

Capable of cutting up to 18 gage mild steel with a maximum cutting length of 36 in., a compact improved foot shear has a wider hold-down, with wide feet, that insures



accurate shearing. Other improvements include correct leverage for capacity cutting with minimum operator fatigue, plus front and rear gages and angle gages as standard equipment. **Frederick Iron & Steel Inc.**

For more data circle No. 38 on postcard, p. 144.

Sorting gage

This automatic sorting gage installed by Superior Steel Corp., measures both the wall and base thickness of copper-clad bullet jacket cups. Actual gaging is done by means of jets of air. A system of pneumatic relays receives measurement signals amplified in



a ratio of 2700:1. These actuate electrical sorting gates, and unacceptable cups are sorted from those within tolerances. Data for quality control is provided by large dials in the cabinet, which show actual dimensions of each piece. The machine was built by **Moore Products Co.**

For more data circle No. 39 on postcard, p. 145.

Turn to Page 182



MIXES BETTER IN HOT WATER. New S.E.C.O. mixes and remains stable even at 180 F. This permits its use in washing and rustproofing.



MIXES EASILY IN COLD WATER. New S.E.C.O. forms stable emulsions in the coldest water . . . even ice water does not affect it.



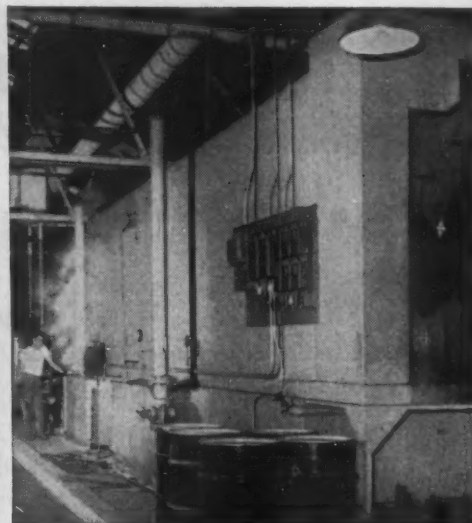
MIXES READILY IN HARD WATER. New S.E.C.O. eliminates the need for special hard-water grades of emulsifying cutting oil.



GRINDING. New S.E.C.O. improves surface finishes because its increased detergency prevents loading and glazing of grinding wheels, prolongs wheel life.



RUSTPROOFING. New S.E.C.O. is a better hot rustproofing medium. It forms stable emulsions, coats metal parts uniformly, protects them against rusting.



WASHING. Because of its increased detergency and its ability to mix and remain stable in hot water, New S.E.C.O. is better for removing grease and dirt from metals.

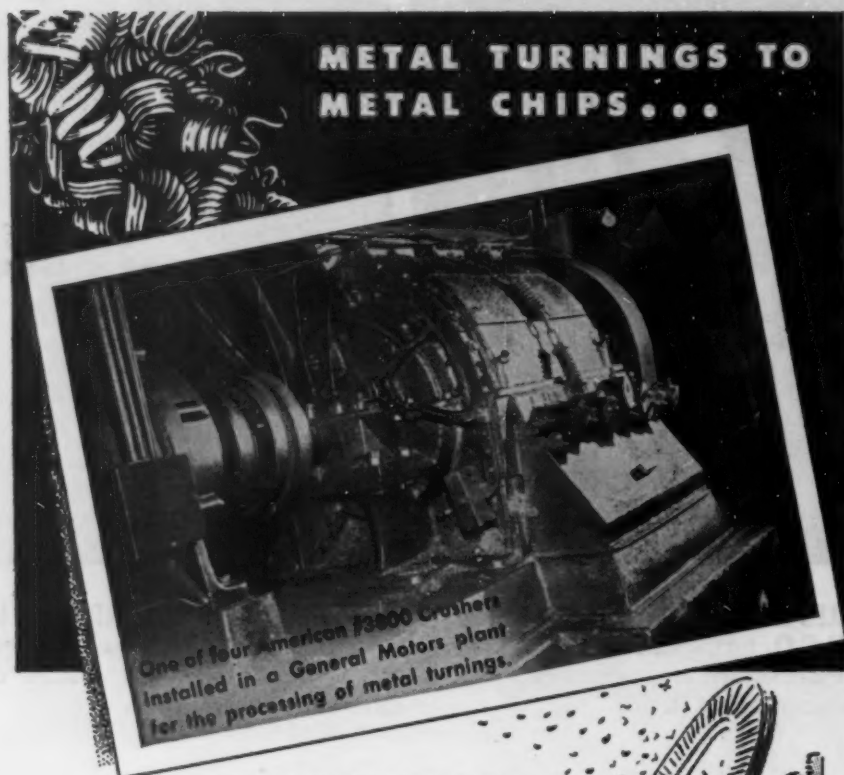
TEST THIS NEW S.E.C.O. IN YOUR OWN PLANT. For more information, call your nearest Sun office or write SUN OIL COMPANY, Phila. 3, Pa., Dept. IA-6.

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American METAL TURNINGS *Crushers*



WHY an AMERICAN installation makes Dollars and Sense:

These cost-conscious companies have long-since learned that American-crushed metal turnings quickly recover an initial American Crusher investment in these important ways:

\$3 to \$4 Extra Profit Per Ton: With higher scrap values for metal chips over ordinary machine shop turnings, a daily crushing capacity of only 2 tons will produce \$1200.00 per year in extra profits.

Up to 80% Less Space: Reduction to metal chips solves many expensive handling and storage problems, and allows easy briquetting.

30-50 Gallons Per Ton Cutting-Oil Recovery: An important reclamation that adds new profits with an American Crusher installation.

Write for Bulletin
"METAL TURNINGS CRUSHERS"

American PULVERIZER COMPANY
Originators and Manufacturers of
Ring Crushers and Pulverizers

PROMINENT AMERICAN CRUSHER USERS

The users of American Metal Turnings Crushers read like a "Who's Who" of American Industry. Included are such names as:

GENERAL MOTORS • FORD
TIMKEN • ALLIS-CHALMERS
GENERAL ELECTRIC • BUDD
WHEEL • CHRYSLER.



New Equipment Continued

Flame-proof coating

Safety factor of a new spray booth coating, called Peel Filmite, is described pictorially. Using a sample of ordinary spray booth coat (left), a lighted match shows it bursts into flame, while Peel



Filmite puffs with a lighted match (right) and then snuffs out. Peel Filmite is a high strength white plastic film that has ease of spraying on and ease of peeling off; provides for greater paint loads. Du Bois Co., Inc.

For more data circle No. 40 on postcard, p. 161.

Vertical milling head

Thirty-two sizes and models of a high speed, heavy duty vertical milling attachment are offered for most makes and sizes of horizontal milling machines, boring mills, and planer machines. The attachment



has lapped-in, heat treated, spiral bevel compound miter gears, running silent in oil. Stepped-up speed range has been increased to 4500 rpm, with ball bearing mounting throughout. Capacity of gear rating, 1½ to 15 hp. Brown Vertical Milling Head Co.

For more data circle No. 41 on postcard, p. 161.

Turn Page

Here's Why The **MICHIGAN** Tractor Shovel WILL DO MORE WORK FOR YOU!



* *This Power Train — from engine to tires — engineered and manufactured by Clark*

* **CLARK TORQUE CONVERTER** — 3-to-1 multiplication factor provides maximum torque when it is needed. Precise control in inching and digging.

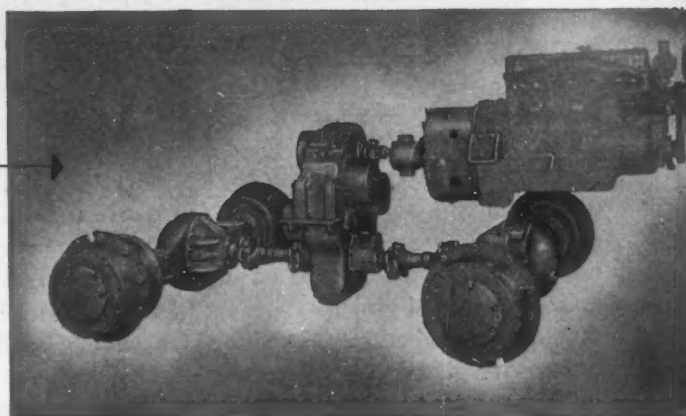
* **CLARK POWER-SHIFT TRANSMISSION** — no conventional clutch; four speeds forward and reverse—direction control by lever on the steering column.

* **CLARK PLANETARY DRIVE AXLE** — final reduction in the wheel reduces the torque load on all gears and shafts.

RESULT — easier operation, utmost accessibility and simplicity of servicing, highest efficiency in shovel handling.

ADD greater weight and more horsepower than any front-end loaders of comparable capacity, and you see why you can Move More with a MICHIGAN*.

*A Trademark of Clark Equipment Company



For full information send for the MICHIGAN Tractor Shovel Fact-Folio — specifications, action photos, magazine article. The coupon will bring your copy.

**CLARK
EQUIPMENT**



CLARK EQUIPMENT COMPANY, Construction Machinery Division
444 Second Street, Benton Harbor, Michigan, U. S. A.

Please send the MICHIGAN Tractor-Shovel Fact-Folio

Name _____ Title _____

Firm Name _____

Address _____

City _____ Zone _____ State _____



Another Bedford Mill Type Crane at Timken Roller Bearing Company

The Timken Roller Bearing Company has just installed a new 30-ton Bedford crane over the stripper building in their mill at Canton, Ohio. This is the second Bedford crane to be installed by the Timken Roller Bearing Company at Canton since July, 1952. The new crane has a 61'2" span with 32'5" lift. Built to AISE specifications, it has air-conditioned cab, worm drive gear on the hoist, and welded girders.

Proof of the superiority of Bedford cranes is found in the high percentage of repeat orders from important owners through the years.

Available in all types and sizes . . .

from 5 tons to 350 tons, and up, for all kinds of indoor and outdoor services . . . each Bedford crane is individually engineered and precision built for its specific application.

Built to the most modern standards and backed by more than 52 years of specialized crane building and *utilization experience* . . . Bedford cranes have won fame the world over for advanced design—and for safe, smooth, more dependable performance.

You are invited to consult a Bedford engineer on your next crane problem . . . with all the facts on the table we believe you too will make your next crane a Bedford.

New York Office: 280 Madison Avenue
New York 16, N. Y., Phone MUrray Hill 5-0233

Pittsburgh Office: Oliver Building, Room 1241
Phone ATlantic 1-0136



STEEL MILL CRANES BEDFORD

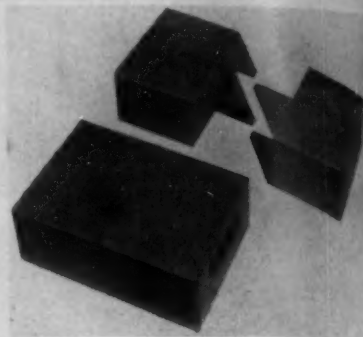
BEDFORD FOUNDRY & MACHINE COMPANY, INC. - BEDFORD, INDIANA

New Equipment

Continued

Interlock box

Faster, more economical handling of packaged items is possible with the new interlock box. It is actually a multiple pack consisting of two or more individual boxes joined

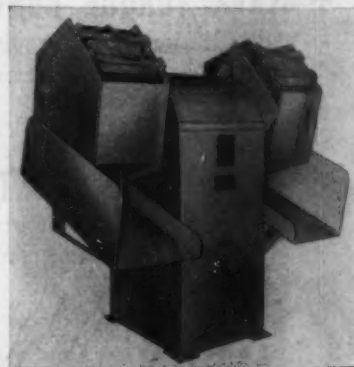


together by interlocking arms. Interlock is designed for use with a core sealer to glue the extending arms joining the sections. Completely sealed units result when the sections are cut apart for case-breaking. *Hinde & Dauch.*

For more data circle No. 42 on postcard, p. 144.

Barrel finisher

Super twin precision barrel finisher has 4 cu ft capacity. Construction features include sealed ball bearings throughout, variable speed drive from 12 to 36 rpm. Hexagonal steel burring barrels are constructed from 10 gage steel,



welded water-tight, and with simple gasketed side covers. Movable chutes can be tilted to the rear to drain off liquid; to the front to discharge load. Barrels can be lined with vinyl plastic. Powered by $\frac{3}{4}$ hp 220/440 v 3-phase motor. *Rampe Mfg. Co.*

For more data circle No. 43 on postcard, p. 144.

Turn Page

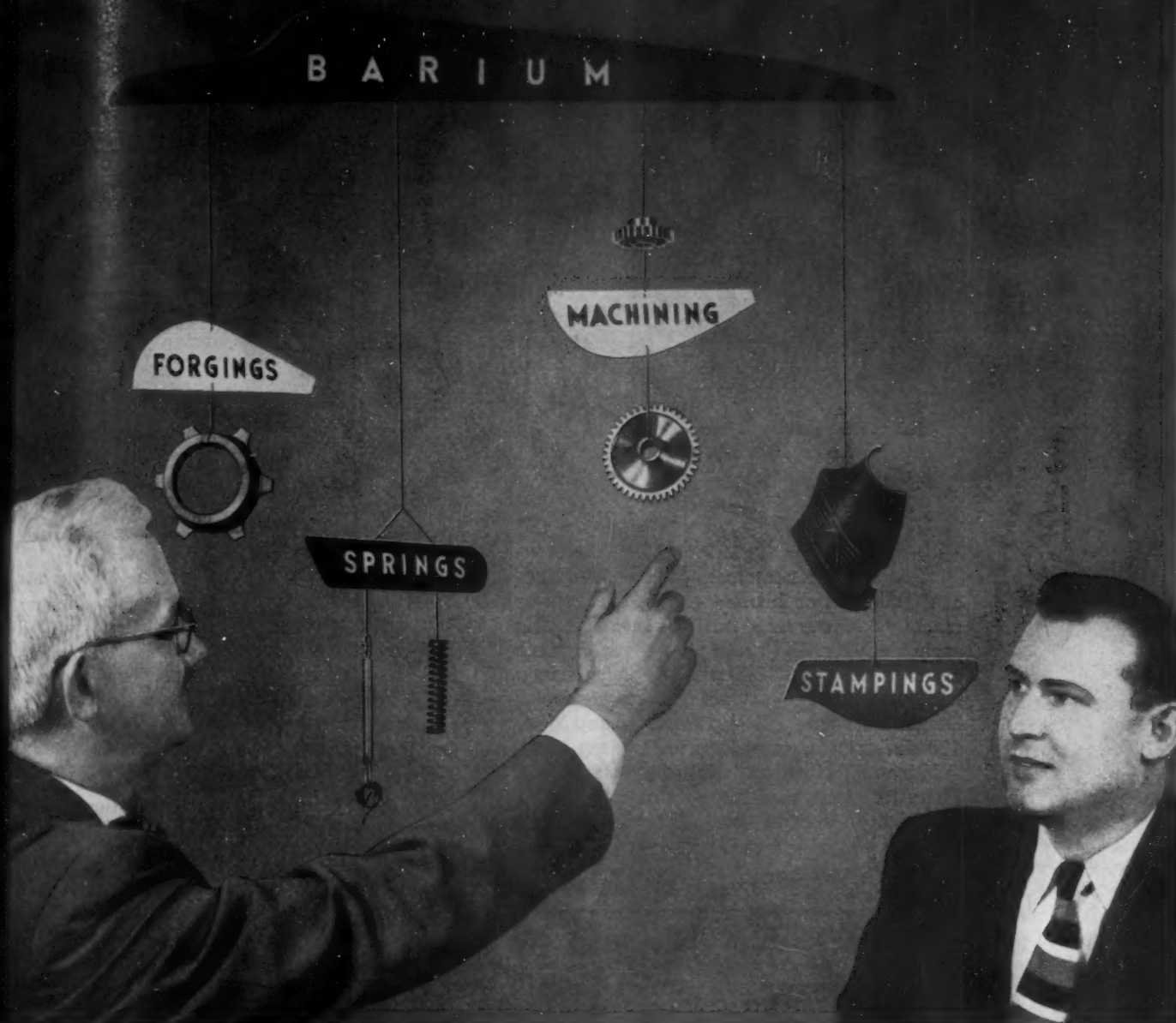
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Get **FOUR** basics from a single source on the double

If you're one of the thousands of manufacturers who use forgings, stampings, springs or machinings, here's a tip:

Barium is one of the few organizations (frankly, we can't think of another) that gives you the opportunity to buy any or all of these basics from just one source. By the piece or assembled, whichever way you need them. We can do this because we've got separate companies devoting their time and talent to each of these operations — not just divisions or departments.

We don't stop there. If you like, your product can receive the free benefit of Barium's "focused engineering". This unique service concentrates on your

problem some of the most advanced engineering thinking being done today in an unequalled variety of fields. Whether you need a bridge girder or an airplane engine, Barium's the place to come for it. That's why dealing with Barium takes a load off your shoulders as well as your desk.

Remember — to Barium your entire order is important. No danger of any component being delayed — Barium keeps sharp watch on all processing. This means faster handling, less paperwork, and pinpointed responsibility. Write for "The Barium Story" — it tells all. BARIUM STEEL CORPORATION, 25 Broad St., New York City 4.



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BAYONNE BOLT CORP. • CENTRAL IRON AND STEEL COMPANY • CHESTER BLAST FURNACE • CLYDE IRON WORKS, INC.
CUYAHOGA SPRING COMPANY • EAST COAST AERONAUTICS, INC. • ERIE BOLT AND NUT COMPANY • GEOMETRIC STAMPING CO.
GLOBE FORGE, INCORPORATED • INDUSTRIAL FORGE & STEEL, INC. • JACOBS AIRCRAFT ENGINE CO. • KERMATH MANUFACTURING CO.
CO. • KERMATH LIMITED (CANADA) • PHOENIX BRIDGE CO. • PHOENIX IRON & STEEL CO. • WILEY MANUFACTURING CO.

CAST BRONZE

BEARINGS, BARS
AND PARTS FOR
EVERY
INDUSTRIAL USE

for immediate delivery

• Whether stock Johnson Bearings and Bars . . . or bronze castings, rough or machined . . . our large facilities make possible early delivery. We are equipped to produce castings up to 18" OD and 20" length, in a wide range of alloys. Over 920 stock sizes of General Purpose (GP) Bearings and over 400 sizes of Universal Bronze Bars are available from stock through Johnson distributors. Write for catalog on these items . . . or send inquiries on special castings and bearings.
JOHNSON BRONZE COMPANY
505 South Mill Street • New Castle, Pa.

JOHNSON BEARINGS
Sleeve Type



All Johnson Universal Bronze Bars 13" length.

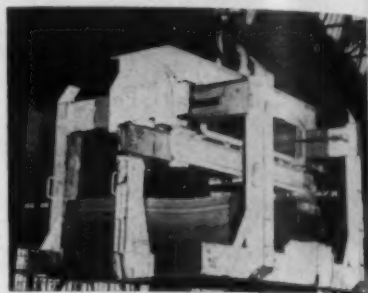
Sleeve
bearing
headquarters
since 1901

New Equipment

Continued

Powered end hooks

New sheet grab has motor-driven end hooks adjustable from a common point. Supported from the cab proper they enable the crane



operator not only to pick up but also to release extremely large or wide sheets without the need of a floor operator. On smaller grabs the end hooks are hand-operated.
Mansaver Industries, Inc.

For more data circle No. 44 on postcard, p. 165.

Automatic degreaser

Powerful turbulent action created by compressed air combined with penetrating chemical properties of cleaning compound enables a new automatic cold washing degreaser to remove heavy deposits of oil, dirt, grease and chips from all types of metal parts. An electric pump



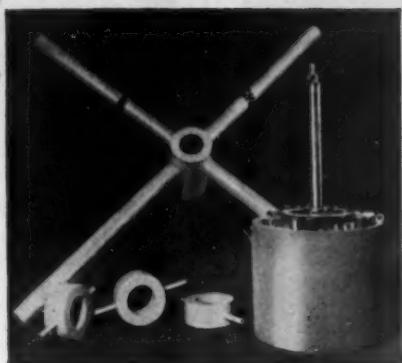
prolongs the life of the cleaning compound by continuously filtering out dirt, chips, and abrasives. Super Cleanmaster Model 50 is equipped with a full length air agitated soaking tank, work shelves, parts basket, drying shelf and compressed air gun for faster parts drying.
Kleer-Flo Co.

For more data circle No. 45 on postcard, p. 165.

Turn Page



Courtesy:
Guaranteed Welding
Engineering Co.,
Clifton, N. J.



Test deadline met...
Costs cut...

with a **FRASSE** tubing "special"

With new turbo propellers already in production, a 3000 pound "dummy" prop was needed quickly to test a new electronic balancing device for the armed forces. In spite of a near impossible one week test deadline, the maker delivered the simulated prop 3 days early—yet cut costs 30%*.

The hub, too large and heavy for standard tubing, was first planned as a forging machined to size. But delivery quoted was six weeks—and machining costs were high.

Frasse supplied a centrifugally spun steel tube 12½" O.D. x 2½" Wall—a Frasse tubing "special"—right from warehouse stock. The large diameter heavy wall tube eliminated costly machining—sped the job to completion in 4 days!

everything in
FRASSE for Steel Tubing

Peter A. FRASSE and Co., Inc.

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PHILADELPHIA 29, PA., 3911 Wissahickon Ave., Baldwin 9-9900
BUFFALO 7, N. Y., P. O. Box K, Station B, Bedford 4700
SYRACUSE 1, N. Y., P. O. Box 1267, Syracuse 73-5241
HARTFORD 1, CONN., P. O. Box 1949, CHapel 6-8835
LYNDHURST • ROCHESTER • BALTIMORE

Tubing "specials" like the one used here are a stock feature at Frasse. Complete and diversified stocks, prompt deliveries and assistance in tubing selection and fabrication "know-how" add up to Frasse—the tubing warehouse. For carbon, alloy and stainless steel tubing make your buy-word Frasse.

*Cost figures available on request

Want details on ALL Frasse tubing?

Send for this new folder describing all Frasse tubular products. Details include analyses, size ranges, mechanical and physical properties—also fabricating hints and ideas for end uses. Frasse tubing "specials" are included too! Mail the coupon for your copy—it's free!



Peter A. FRASSE & Co., Inc.
17 Grand Street
New York 13, N. Y.

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Please send a free copy of your folder on steel tubular products.

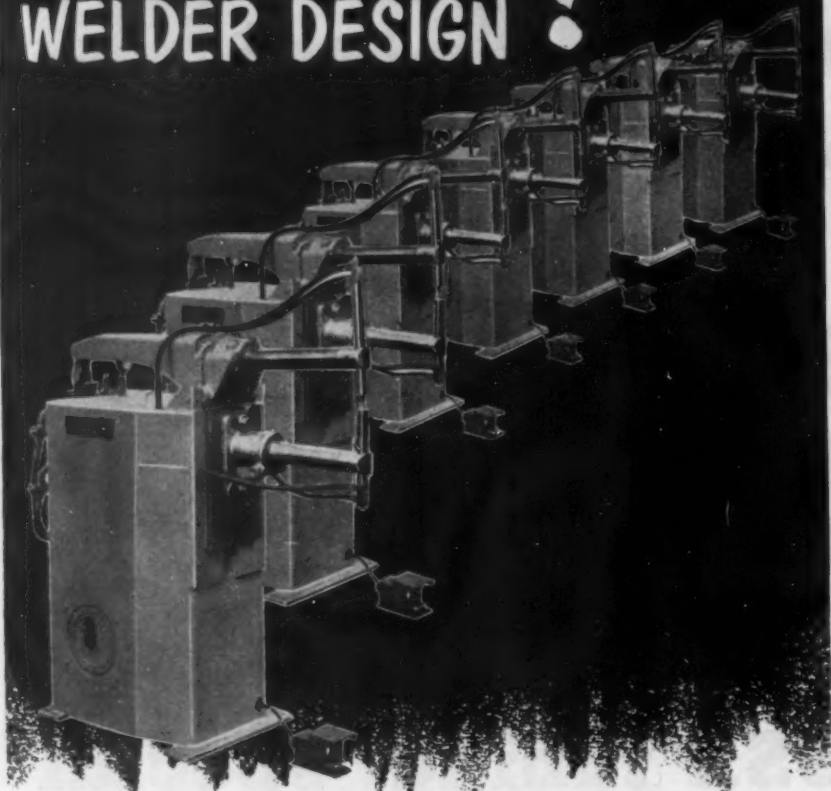
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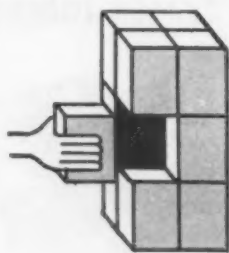
City, Zone & State _____

WHAT'S NEW IN WELDER DESIGN ?



UNITIZED CONSTRUCTION, IMPROVED DESIGN of Federal's Rocker-Arm Spot Welder MEANS BETTER WELDS, FASTER, LOWER UPKEEP

UNITIZED DESIGN A Federal Exclusive!



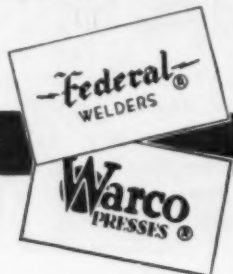
Component parts of each system are sectionized and mounted on individual, removable panels. Normal "down-time" is reduced to an absolute minimum; maintenance greatly simplified.

Federal's New Rocker Arm Spot Welders—redesigned from base to tip—to deliver highest production with a minimum of operating and maintenance costs. Feature for feature they are the outstanding low cost spot welders of this type available today.

Here's a few of the many features: Unitized Design, built in sections for easy maintenance and interchangeability; More Space, tapered frame permits greater working areas; Compact Construction, trims bulk—all lines are outside frame—easily accessible without unsightly and dangerous protrusions; Ferrule Fittings, with threaded couplings, permit quick, simple disconnect of all water and air connections; Low Loss Cylinder of new design boosts efficiency as does the new style Low Inertia, streamlined Horn Raising Lever. It's all new! It's welding efficiency at it's finest. It's another reason why welding engineers trust "Federal—First in Resistance Welding."

THE FEDERAL MACHINE AND WELDER COMPANY

WARREN, OHIO

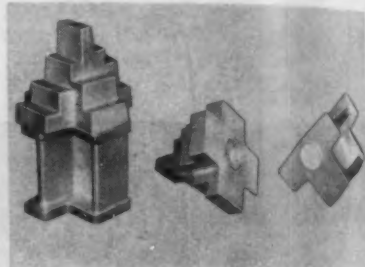


New Equipment

Continued

Aluminum setup blocks

Multi-step setup blocks made of aluminum alloy will withstand great weight under clamping pressures. They save machine setup time and protect expensive machine tables from scratches and



nicks. Softer than the machine table, these new blocks are said actually to absorb metal chips. The blocks hold work from 0 to 3 in. Mounted on risers they can be pyramided to any height. *Jergens Tool Specialty Co.*

For more data circle No. 46 on postcard, p. 155.

Plastics molding

Hydraulic presses built for fiber glass molding are made in capacities of 50 to 300 tons; larger presses are built to customer requirements. The 100-ton press illustrated has stripping capacity of 30 tons. Operating pressure is 2460 psi, a 36-in. stroke, and the press accommodates dies up to 48 in. from l to r and 36 in. from f to b. Operation is pushbutton controlled. Press advances at 400 ipm, automatically slows down to desired pressing speed. Any length of cure cycle can be preset. *Elmes Engineering Div.*

For more data circle No. 47 on postcard, p. 155.



THE IRON AGE SUMMARY...

- ↓ Prices may soon become hotter than wage question
- ↓ Higher wages may lead to \$2 to \$3 price increase
- ↓ Scrap prices decline but ingot rate gains again

Prices... Steel prices may soon become as hot an issue as the wage question. They could turn out to be hotter. That's because steelmakers are gradually being forced into the position of risking price increases in a relatively weak market.

They had hoped they could keep the cost of a wage agreement low so that they wouldn't have to face the issue of higher prices. But they feel they must raise prices if wage costs go up more than a few pennies an hour.

Some of steel's biggest customers, including auto companies, have been alerted in advance that if steel loses at the bargaining table they can expect some steel price increases. Some of them already have their backs bowed to resist any move to raise prices. While it is doubtful that they can forestall the increases, they can certainly make it unpleasant for their suppliers. The customer is more potent than he has been at any time since World War II.

This is intensifying steel management's efforts to keep wage costs in line. Yet it is expected that the wage agreement will finally call for a 5¢ to 8¢ "package." This would probably be followed by a price increase averaging about \$2 to \$3 a ton. Some products might be raised considerably more than that, and some not at all.

Steelmaking scrap prices slipped for the second straight week after eleven consecutive weeks of increase.

New Business... Steel consumers are reacting much more calmly to the wage negotiations than they have in the past several years. Some strike or price hedge buying has been noted. But it isn't nearly as big a factor in the market as it has been in past years. From now on orders will reflect real demand because it is too late to produce hedge orders before the June 30 wage contract deadline.

Rush orders for spot shipments are helping support fairly high level mill operations. Overall steel inventories are still sinking. Cancellation and hold-up orders are almost totally lacking.

Production... Steelmaking operations are expected to gain another half point this week, after last week scoring the biggest advance of the year to date. This week mills are scheduled to operate at 73.5 pct of rated capacity. If that rate is achieved the production index for the week will be 109.1 (1947-49 = 100).

Significance... Despite some false strength from hedging, the steel market is showing steady improvement based on real demand. There may still be a seasonal slump during the hot months. But it probably won't be as serious as many had expected. The steel market has passed the worst of its shake out. As more people become aware of this, optimism will grow.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production				
(Net tons, 000 omitted)	1,752	1,746	1,712	2,183
Ingot Index				
(1947-49=100)	109.1	108.7	106.6	139.9
Operating Rates				
Chicago	84.0	85.5*	81.5	106.0
Pittsburgh	72.0	71.0*	70.0	99.0
Philadelphia	59.0	59.0	60.0	98.0
Valley	69.0	68.0*	67.0	99.0
West	84.0	80.5*	75.5	104.5
Detroit	95.0	88.0	79.0	103.0
Buffalo	67.5	67.5	67.5	106.5
Cleveland	67.0	67.0*	67.0	92.5
Birmingham	78.0	78.5	76.5	101.0
S. Ohio River	86.0	82.5	82.5	90.0
Wheeling	88.0	90.0*	92.0	101.0
St. Louis	72.5	72.5	73.5	82.5
East	61.0	62.5*	50.5	87.0
Aggregate	73.5	73.0	71.5	100.0

* Revised. † Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.634	4.634	4.634	4.632
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$55.26
Scrap, No. 1 hvy (gross ton)	\$28.08	\$28.25	\$28.08	\$40.50
Nonferrous				
Aluminum, ingot	21.50	21.50	21.50	20.50
Copper, electrolytic	30.00	30.00	30.00	29.875
Lead, St. Louis	14.05	14.05	13.80	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	93.625	93.75	93.50	92.50
Zinc, E. St. Louis	11.00	11.00	10.25	11.00

June 17, 1954

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***"Both management
and labor approve the
Payroll Savings Plan..."***

MEYER KESTNBAUM

*President
Hart Schaffner & Marx*

"Both management and labor approve the Payroll Savings Plan for the purchase of United States Savings Bonds because it enables loyal American workers to help themselves and their country at the same time. A strong backlog of savings is a stabilizing factor in the economy. It is also an element of comfort and security for the individual because it helps him plan a sound future built on sound money. We at Hart Schaffner & Marx take pride in the fact that we introduced the Payroll Savings Plan in 1940 and that it has been continually in operation since that time."

As president of a company which was among the first to offer its employees an opportunity to build for their future through the systematic investment in U.S. Savings Bonds, Mr. Kestnbaum is well qualified to evaluate the benefits of the Payroll Savings Plan:

- *"A strong backlog of savings"*: The cash value of Series E and H U.S. Savings Bonds held by individuals at the end of March, 1954 amounted to \$37,175,000,000.
- *"a stabilizing factor in the economy"*: The month-after-month investment of millions of dollars in Savings Bonds by more than 8,000,000 enrolled Payroll Savers constitutes probably our strongest check on inflation.
- *"a sound future built on sound money"*: During 1953, sales of Series E and H Savings Bonds—22% higher than in 1952—provided cash for all maturities and

redemptions of those series and still left more than \$210,000,000, net.

- *"Both management and labor approve the Payroll Savings Plan"*: In company after company, management and labor have joined in a planned effort to put a Payroll Savings application blank in the hands of every employee. These simple, person-to-person canvasses have built employee participation in many companies to 90%, 95% and even higher.

If employee participation in *your* Payroll Savings Plan is less than 50%—or if your company does not have a Payroll Savings Plan—get in touch with Savings Bond Division, U. S. Treasury Department, Washington, D. C. Learn how easy it is to help your country, your employees, and your company—through the Payroll Savings Plan.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

The Iron Age



Strike Hedging Sparks Order Rush

Possible strike and probable cost increase brings scramble for June deliveries . . . Little war-scare buying . . . Peaceful settlement of contract will bring July letdown.

Steel producers are afraid the scramble for June deliveries is due for the most part to (1) hedging against a possible steel strike, and (2) probability of a price increase should the steel labor settlement advance employment costs more than a few pennies an hour.

Little if any buying is attributed to fear of full-scale American intervention in Indo-China.

A peaceful settlement of contract negotiations will likely be followed by a letdown in July due to over-ordering in June. Strike hedging initially was limited to tinplate, but has spread to other products, including sheets and bars. An automotive supplier is taking in 10 pct more steel this month than he would have if labor discussions were not a factor.

Another influence on the summer market outlook is vacations. Many consumers will close up shop for 2-to-3 weeks.

While consumer inventories are still having a depressing effect on the market, there are increasing signs that bottom of the barrel is in sight. A mid-western warehouse that had an inventory of 130,000 tons at beginning of year has worked off 75 pct of it.

SHEETS AND STRIP . . . Detroit buying has picked up significantly in last 2 weeks, mostly as a hedge against a strike; producers look for letdown in July-August if walkout does not materialize. Chicago market is leveling out and July deliveries are expected to show a decline from June. West Coast demand is strong, with inventories off and appliance buying on upcurve. East Coast, Pittsburgh, and Cleveland report improved demand, expectation of a slump following labor settlement. Galvanized continues strong. Tinplate shows signs of easing in July.

Purchasing Agent's Checklist

STEEL: Contract may boost price \$3 per ton p. 97

PLASTICS: Industry will top 1953 by 5 pct p. 101

ALUMINUM: Expanding usage for truck bodies p. 99

CONTROLS: Will not return immediately p. 123

BARS . . . Bar market continues easy, although some centers report a June pickup attributed to scattered strike hedging and ordnance work. Shell makers have stepped up bar orders in the East, where highway contracting also is sustaining demand for reinforcing bars. In Chicago, producer inventories of both hot-rolled and cold-finished are high; delivery promises are running 2 to 4 weeks; farm equipment demand is fair; demand for alloy bars poor. Cleveland showed improvement in June. Pittsburgh mills are hurting for business.

WIRE . . . Market is active in most areas. In Pittsburgh merchant wire is off sharply but this is largely offset by upturn in manufacturers wire; construction products demand continues good. A pickup in merchant wire and nails is noted in East. Chicago market is strong and vacation shutdown of one producer is expected to tighten order books slightly. Detroit demand is good. West Coast reports industrial wire requirements improving but agricultural demand continues weak. Imported nails have thrown West Coast market into turmoil, particularly in Los Angeles area, where consumers are buying direct, by-passing local jobbers.

PLATES . . . Price reduction by Central Iron & Steel Co. of \$5 per ton not expected to affect general price structure. Chances of higher

labor costs in near future lend substance to position of other producers against following Central's lead. Demand in most centers is only fair; consumers are ordering against immediate requirements. West Coast market is stronger; larger diam pipe demand shows a moderate increase.

STRUCTURALS . . . High level of construction activity providing strong support for the market. Phoenix Iron & Steel price reduction of \$7 per ton on standard structurals and wide-flange beams will not be met by other producers. Awarding of contract for 50,000-ton New Orleans bridge job expected to give Southern market a shot in the arm. Refusal of other producers to be panicked by Phoenix action indicates confidence in future demand and realization that move would not make sense if new labor contract should increase costs substantially.

TUBULAR PRODUCTS . . . Market is slightly more competitive in oil country goods but reports from all centers indicate continued strong demand, probably for balance of year. Standard pipe is on-again, off-again, with producers maintaining good inventories, competing on quick delivery. A Chicago mill is quoting 90-day delivery on oil country, slightly more extended than mills in some other areas.

WAREHOUSE . . . Early June buying, less than in May, is comparable with April in Chicago district; alloy and hot-rolled bar demand is off, along with hot-rolled and cold-rolled sheet and strip. Galvanized demand continues good; plate is softening; overall decline is attributed in part to upcoming plant vacations; inventories are still good. Detroit reports an upturn in variety of products, probably due to increased buying of small manufacturers. Emphasis on quick delivery in all centers, including Pittsburgh and Cleveland.

PIG IRON . . . Low-priced cast scrap is hurting market in the East. Ratio of scrap to pig iron in some foundries running as high as 90-to-10 pct. Market level continues on straight line but below last year. Foreign pig iron price still running \$12 below domestic levels.

Nonferrous Markets

Steel Will Set Aluminum Wage Pattern

Aluminum labor contracts expire July 31 . . . Watch steel's June 30 deadline for the aluminum tipoff . . . Wage boost will increase price pressure—By R. L. Hatschek.

Watch the steel industry's labor negotiations for the tipoff on what will happen in aluminum. Aluminum's labor contracts expire July 31 and no official talks have yet been launched. But as soon as steel's new contracts are written, labor will go after substantially the same from aluminum producers.

This pattern was established in earlier days when aluminum was much smaller. Today aluminum is the No. 2 metal behind steel. Since the light metal industry faces different problems, it would like to break away. But as long as labor makes the demands, they'll be similar in both industries.

For the latest information on steel industry labor negotiations see p. 97.

Because of aluminum's market strength as compared to steel, aluminum labor stands in a stronger position, hence may go after a bigger settlement. And the stronger market also means that a price boost wouldn't hurt as much.

Pig and ingot don't take much labor. But the newest plants, despite their higher efficiency, cost three to four times as much as earlier facilities. Partly a hang-over from price controls, partly because facilities are new, costs and prices are not closely lined up. A

ALUMINUM SHIPMENTS

(Net Tons)

	Apr.	Mar.
Sheet & Plate, total.....	43,319	41,242
Non-Heat-Treatable	34,031	31,240
Heat-Treatable	9,288	10,003
Foil	5,699	5,919
Extruded products, total.....	11,131	10,851
Soft Alloys	8,039	7,749
Hard Alloys	3,093	3,102
Tube, Drawn, total	2,790	3,458
Soft Alloys	2,410	3,050
Hard Alloys	380	408
Rod & Bar, Rolled	6,115	5,419
ACSR & Cable, Bare.....	5,770	5,097
Wire, Other than Conductor	1,589	1,423
Forgings	2,044	2,129
Castings, total	11,935	12,964
Sand	984	1,032
Permanent Mold	5,565	5,945
Die	5,386	5,987

wage hike will give producers the chance to straighten this out.

In mill products, however, labor figures much higher—and the likelihood of a price hike to compensate a wage boost is that much stronger.

ALUMINUM . . . Primary aluminum production climbed to still another new high in May with a total of 125,088 tons as compared to 120,434 in April. This brings the total output for the first 5 months to 594,590 tons—a rate which insures topping 1.4 million tons this year if no power shortage or other curtailing factor shows up.

April mill product shipments were higher in some cases, lower in others

—but still not up to primary output. The difference is going into the national stockpile and it's more than the stockpilers are asking for.

COPPER . . . Supplies of the red metal are getting tighter and consumer's orders for July copper are reported higher than anticipated. July vacations will just about cut in half general needs for the metal so it seems that buyers are beginning to rebuild inventories — possibly as a hedge against higher prices.

ZINC . . . General Services Administration is reportedly accepting zinc offered for the stockpile—but tonnage is only about 50 pct of what is being offered. Price, presumably, is the current market quotation.

Statistics of the American Zinc Institute were regarded with disappointment by the trade as stocks held by smelters showed an increase of a little over 9000 tons. At the beginning of the month they stood at 209,828 tons. Production, fairly steady on a daily basis, rose to 73,654 tons in May (April 70,258 tons) and total shipments declined from 70,618 tons in April to 64,566 tons in May.

But the increase in stocks couldn't dim the optimism created by renewed stockpiling.

LEAD . . . As in zinc, producers offered GSA quantities of lead at the current 14.25¢ quotation. But it's reported that GSA refused to accept any. The trade hasn't been informed of the reason.

Both lead and zinc for the stockpile, by the way, must have been mined after April 1, 1954 and must be delivered before Aug. 2.

TIN . . . Hearings on continued operation of the Texas City tin smelter were scheduled for this week by the House Banking and Currency Committee and the likelihood is that the smelter will continue for at least another year.

One problem to be ironed out is replacement of Reconstruction Finance Corp. as operator of the smelter. GSA may take over when RFC bows out of existence at the end of this month, or it may be turned over to the Treasury Dept.

At any rate, the government is bargaining with Bolivia for 12,000 tons of tin in concentrates to supply the smelter.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

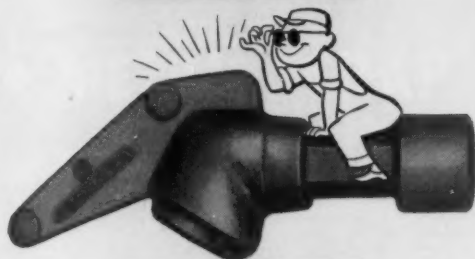
	June 9	June 10	June 11	June 12	June 14	June 15
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered ...	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	93.625	94.25	93.75	....	93.625	93.625*
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	14.05	14.05	14.05	14.05	14.05	14.05

Note: Quotations are going prices

*Tentative



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ERIE, PENNSYLVANIA

Nonferrous Prices

(Effective June 15, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. allowed)

Flat Sheet: 0.136 in. and thicker, 2S, 3S, 33.9c; 4S, 36.0c; 52S, 38.2c; 24S-O, 24S-OAL, 37.0c; 75S-O, 75S-OAL, 44.7c; 0.081-in., 2S, 3S, 35.1c; 4S, 37.7c; 52S, 39.9c; 24S-O, 24S-OAL, 38.4c; 75S-O, 75S-OAL, 46.9c; 0.032-in., 2S, 3S, 37.0c; 4S, 41.8c; 24S-O, 24S-OAL, 46.9c; 75S-O, 75S-OAL, 58.4c.

Plate, 1/4-in., and heavier: 2S-F, 3S-F, 32.4c; 4S-F, 34.5c; 52S-F, 36.2c; 61S-O, 35.5c; 24S-O, 24S-OAL, 36.9c; 75S-O, 75S-OAL, 44.3c.

Extruded Solid Shapes: Shape factors 1 to 5, 36.5c to 82.8c; 12 to 14, 37.2c to 99.0c; 24 to 26, 39.9c to \$1.29; 36 to 38, 47.2c to \$1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8c to 37.2c; cold-finished, 0.375 to 3.449-in., 2S-F, 3S-F, 47.6c to 39.3c.

Screw Machine Stock: Rounds, 11S-T3, 1/2 to 1 1/2-in., 69.6c to 47.0c; 3/4 to 1 1/2-in., 46.6c to 43.8c; 1 9/16 to 3-in., 42.7c to 39.9c. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1c to 32.4c; 52S, 53.4c to 39.1c; 17S-T4, 60.1c to 41.8c; 61S-T4, 53.9c to 41.3c.

Extruded Tubing: Rounds, 63S-T5, OD 1 1/4 to 2-in., 31.6c to 60.7c; 2 to 4 in., 37.7c to 51.1c; 4 to 6 in., 38.2c to 46.6c; 6 to 9 in., 38.7c to 48.8c.

Roofing Sheet: Flat, per sheet, 0.032-in., 42 3/4 x 60 in., \$2.838; x 96 in., \$4.543; x 120 in., \$5.680; x 144 in., \$6.816. Coiled sheet, per lb, 0.019 in. x 28 in., 30.8c.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O 1/4 in., 56c; 3/16 in., 57c; 1/8 in., 60c; 0.064 in., 73c; 0.032 in., 94c. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 77c; 1/2 to 3/4 in., 60.5c; 1 1/4 to 1.749 in., 56c; 2 1/2 to 5 in., 51.5c. Other alloys higher. Base up to 3/4 in. diam, 10,000 lb; 3/4 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3c; 0.22 to 0.25 lb, 5.9 in., 62.3c; 0.50 to 0.59 lb, 8.6 in., 59.7c; 1.8 to 2.59 lb, 19.5 in., 56.8c; 4 to 6 lb, 28 in., 52c. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, 1/4 to 5/16 in., \$1.43; 5/16 to 3/4 in., \$1.29; 3/4 to 1 in., 96c; 1 to 2 in., 79c; 0.165 to 0.219 in. wall: OD, 3/4 to 1 in., 64c; 1 to 2 in., 60c; 3 to 4 in., 59c. Other alloys higher. Base, OD: Up to 1 1/2 in., 10,000 lb; 1 1/2 to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$11; Bar, HR or forged, \$6; Forgings, \$6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86 1/2	67 1/2	92 1/2
Strip, CR	92 1/2	70 1/2	98 1/2
Rod, bar	82 1/2	65 1/2	88 1/2
Angles, HR	82 1/2	65 1/2	88 1/2
Plate, HR	84 1/2	66 1/2	90 1/2
Seamless tube	115 1/2	100 1/2	137 1/2
Shot, blocks	60		

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41		48.48
Copper, h-r	48.38	44.73	
Copper, drawn		45.98	
Low brass	44.47	44.41	
Yellow brass	41.72	41.66	
Red brass	45.44	45.38	
Naval brass	45.76	40.07	
Leaded brass			39.11
Com. bronze	46.95	46.89	
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36		62.63
Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.			
Strip			\$1.68
Rod, bar, wire			1.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 21.50
Aluminum pig 20.00
Antimony, American, Laredo, Tex. 28.50
Beryllium copper, per lb conta'd be. \$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be \$72.75
Bismuth, ton lots \$2.25
Cadmium, del'd \$1.70
Cobalt, 97-99% (per lb) \$2.60 to \$2.67
Copper, electro, Conn. Valley 30.00
Copper, Lake, delivered 30.00
Gold, U. S. Treas., per troy oz. \$35.00
Indium, 99.8%, dollars per troy oz. \$2.25
Iridium, dollars per troy oz. \$165 to \$175
Lead, St. Louis 14.05
Lead, New York 14.25
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 27.00
Ingot 27.75
Magnesium, sticks, 100 to 500 lb, 46.00 to 48.00

Mercury, dollars per 76-lb flask, f.o.b. New York \$270 to \$275
Nickel electro, f.o.b. N. Y. warehouse 63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel 56.25
Palladium, dollars per troy oz. \$210.00
Platinum, dollars per troy oz. \$84 to \$87
Silver, New York, cents per troy oz. 85.25
Tin, New York 93.625
Titanium, sponge, grade A-1 \$4.72
Zinc, East St. Louis 11.00
Zinc, New York 11.50
Zirconium copper, 50 pct \$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered carloads)

85-5-5-5 ingot
No. 115 27.00
No. 120 26.25
No. 123 25.75
80-10-10 ingot
No. 305 31.50
No. 315 29.25
88-10-2 ingot
No. 210 41.25
No. 215 37.75
No. 245 33.25
Yellow ingot
No. 405 23.25
Manganese bronze
No. 421 26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper, max. 22.50-22.75
0.60 copper, max. 22.25-22.50
Piston alloys (No. 12 type) 20.00-21.25
No. 12 alum. (No. 2 grade) 19.25-19.75
108 alloy 19.75-20.25
195 alloy 21.00-21.50
13 alloy (0.60 copper max.) 22.25-22.50
ASX-679 19.75-20.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97 1/2% 20.00-20.50
Grade 2—92-95% 19.00-19.50
Grade 3—90-92% 18.00-18.50
Grade 4—85-90% 17.00-17.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper
Cast, oval, 15 in. or longer 42.64
Electrodeposited 41.88
Flat rolled 45.04
Brass, 80-20
Cast, oval, 15 in. or longer 43.515
Zinc, flat cast 20.25
Ball, anodes 18.50
Nickel, 99 pct plus
Cast 84.00
Cadmium \$1.75
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn. 94 1/2

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63.00
Copper sulfate, 99.5 crystals, bbl. 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 30.00
Nickel chloride, 375 lb drum 38.00
Silver cyanide, 100 oz. lots, per oz. 75 1/2
Sodium cyanide, 96 pct domestic 200 lb drums 19.25
Zinc cyanide, 100 lb drum 54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1c per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25 1/2
Yellow brass	19 1/2	18
Red brass	23	22 1/2
Comm. bronze	23 1/2	22 1/2
Mang. bronze	18 1/2	17 1/2
Yellow brass rod ends	19 1/2	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27 — 27 1/2
No. 2 copper wire 26 1/2 — 25 1/2
Light copper 24 — 24 1/2
Refinery brass 23 1/2 — 23
Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27 — 27 1/2
No. 2 copper wire 26 1/2 — 25 1/2
Light copper 24 — 24 1/2
No. 1 composition 21 1/2
No. 1 comp. turnings 20 1/2
Rolled brass 17 1/2
Brass pipe 18 1/2
Radiators 17 1/2 — 17 1/2

Aluminum
Mixed old cast. 11 1/2 — 12 1/2
Mixed new clips 12 1/2 — 13
Mixed turnings, dry 12 1/2 — 13
Pots and pans 12 — 12 1/2

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire. 24 1/2 — 25
No. 2 heavy copper and wire. 22 — 23 1/2
Light copper 21 — 21 1/2
New type shell cuttings 20 1/2
Auto radiators (unswaged) 19 — 19 1/2
No. 1 composition 18 1/2 — 19
No. 1 composition turnings 18 1/2 — 19
Unlined red car boxes 16
Cocks and faucets 16 — 16 1/2
Mixed heavy yellow brass 13
Old rolled brass 15 1/2
Brass pipe 16 1/2 — 17
New soft brass clippings 17 1/2 — 18
Brass rod ends 15 — 16
No. 1 brass rod turnings 14 — 15

Aluminum

Alum. pistons and struts 7 — 8
Aluminum crankcases 10
2S aluminum clippings 13
Old sheet and utensils 10
Borings and turnings 6 — 7
Misc. cast aluminum 10
Dural clips (24S) 11

Zinc

New zinc clippings 6 — 6 1/2
Old zinc 4 1/2 — 5
Zinc routings 8 — 9
Old die cast scrap 8 — 9 1/2

Nickel and Monel

Pure nickel clippings 60 — 65
Clean nickel turnings 40
Nickel anodes 60 — 65
Nickel rod ends 20 — 25
New Monel clippings 23 — 28
Clean Monel turnings 16 — 18
Old sheet Monel 21 — 22
Nickel silver clippings, mixed. 15
Nickel silver turnings, mixed. 18

Lead

Soft scrap lead 11 1/2 — 11 1/2
Battery plates (dry) 5.90 — 6.15
Batteries, acid free 4.40

Magnesium

Segregated solids 18 1/2 — 19
Castings 17 1/2 — 18

Miscellaneous

Block tin 75 — 80
No. 1 pewter 55 — 60
No. 1 auto babbitt 45 — 48
Mixed common babbitt 12 1/2 — 13 1/2
Solder joints 45
Siphon tops 15 1/2
Small foundry type 14 1/2
Monotype 13 1/2
Lino. and stereotype 11 1/2
Electrotype 8 1/2
Hand picked type shells 5 1/2
Lino. and stereo. dross 4 1/2
Electro dross 4 1/2

• **NON-FERROUS METALS**

• **ORES AND MINERALS**

• **METALLIC RESIDUES**

• **METAL SCRAP**

• **FERRO ALLOYS**

• **ZINC**

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Iron and Steel Scrap Markets

Dull Market Shows More Soft Spots

Blast furnace reactivation depresses some markets . . . Cast demand slacks off . . . Composite drops 17¢ . . . Railroad grades down in Chicago . . . West Coast active, some prices up.

Buying activity was down throughout most of the U. S. this week. Chicago sales were noticeably low in all grades. Price declines spotted throughout the market areas reflected the decrease in demand. General leveling off gives a pretty good indication that the peak in the price uptrend of the last 3 months has been passed for the time being.

Blast furnaces returning to operation in Pittsburgh and Cleveland had a definitely negative effect on demand in those markets. Railroad grades, in the past few weeks a market bright spot, have declined about \$1 in Chicago.

THE IRON AGE composite dropped 17¢ to \$28.08 reflecting an easing in No. 1 steel in Chicago. This grade remained unchanged in Pittsburgh, as did other open-hearth grades in that district. Philadelphia remained unchanged although activity in that market was at a near standstill.

Most scrap sources saw few signs there would be a pickup in the market during the rest of the month and further weakening is expected in July when plantwide vacations come into full sway.

Export demand in New York had a favorable effect on No. 1 heavy melting steel, pushing it up \$1. Demand for cast grades has eased considerably in most markets.

Pittsburgh . . . Market is dull and tending toward further weakness. An independent consumer last week restored a blast furnace to operation, cutting his scrap requirements by about 50 pct. On the basis of offers to sell, low phos scrap dropped \$1 per ton, and No. 1 railroad declined in sympathy. Outlook for balance of the month is poor.

Chicago . . . Broker buying activity in Chicago was slowing last week. Electric furnace grade was softer at the consumer level, and broker buying in this grade was reported particularly poor. Cast, which has been moving with fair strength in recent weeks, was somewhat weaker and activity at the dealer level was poor. Mill inventories are regarded as high. One bright spot in the picture has been railroad specialties, which have held relatively well. No. 1 RR heavy melting, another strong item in past weeks, is slowing noticeably.

Philadelphia . . . Combination of sizeable stockpiles and slow steelmaking operations is too much for this market. Scrap is weak, though only one price is quoted lower this week on a small sale. Cast grades, strong up to this point, are easier in anticipation of foundry vacation shutdowns coming next month.

New York . . . While it's likely to be temporary, export demand pushed No. 1 heavy melting steel price up \$1 per ton this week. This business might not be significant if it weren't for the contracted domestic market. Destination of the scrap, which does not include bundles, is reported to be Yugoslavia.

Detroit . . . Prices held to their present levels in steelmaking grades although absence of new buying gave the trade some uneasy feeling. This market is now pegged by Chicago purchases and could drop sharply if the market there should lose interest in Detroit bundles. Cast dropped as much as \$2 in some grades because of a seasonal foundry slump.

Cleveland . . . Prices are unchanged and mills reportedly considering reactivating blast furnaces to minimize scrap requirements. In Youngstown district one consumer reportedly paid \$33 for a small tonnage of high grade industrial scrap over last weekend but market price was not affected. Brok-

ers say their prices for dealer scrap are holding at present levels. July vacations are expected to further depress market.

Birmingham . . . Dealers report a little more scrap coming in since the first of the month, partly reflecting increase in cast prices and partly reflecting layoffs in many plants, setting more people to gathering scrap. An Atlanta steel mill was back in the market this week, buying limited tonnage at unchanged prices. Electric furnace bundles advanced \$1 this week and unstripped motor blocks were 50¢ higher.

St. Louis . . . Steel mills are delaying commitments for scrap iron pending settlement of international problems and wage agreements with the CIO. Receipts are well up with demand and prices are unchanged. Demand for cast grades continues strong.

Cincinnati . . . With mill buying disposed of in the first 2 weeks of the month, little activity is looked for until July. Market is orderly and quiet. Prices are unchanged.

Buffalo . . . Mixed tendencies developed in the scrap market here. The recent advance in cast was reversed with declines of \$1 to \$2. On the other hand, steelmaking grades held firm with dealers refusing to accept new orders at prevailing prices despite their heavy yard stocks.

Boston . . . Little activity in this area. Demand for high quality mixed borings and short turnings and shortening turnings raised prices on these items about \$1. Otherwise, dealers say they'll go on vacation next week if market doesn't pick up.

West Coast . . . No. 2 bundles quotation went up \$2 in Los Angeles last week as steel producers abandoned springboards. Net result to dealers is a decline and they were reluctant to ship. In the Seattle area No. 2 bundles advanced \$1 at the top range as out-of-area tonnage started coming in. Cupola cast stayed strong as inventories shrank. Prices, however, remained unchanged at top range, now \$44 top in Los Angeles and \$45 top in San Francisco.

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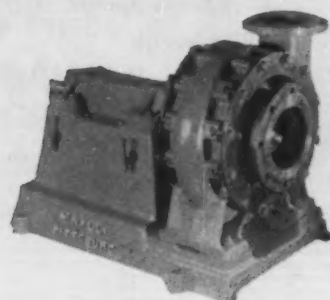
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P. L. Robertson Mfg. Co., Ltd.
Milton, Ontario

Scrap Prices

(Effective June 15, 1954)

Pittsburgh

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and ms. turns.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs, plate	31.00 to 32.00
Heavy turnings	28.00 to 29.00
No. 1 RR. hvy. melting	31.00 to 32.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	43.00 to 44.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	31.00 to 32.00

Chicago

No. 1 hvy. melting	\$31.00 to \$33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 factory bundles	33.00 to 34.00
No. 1 dealers' bundles	30.00 to 32.00
No. 2 dealers' bundles	21.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	37.00 to 38.00
Low phos. punch'gs, plate	33.00 to 35.00
Low phos. 3 ft and under	32.00 to 34.00
No. 1 RR. hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	38.00 to 39.00
Rerolling rails	43.00 to 45.00
Rails 2 ft and under	44.00 to 46.00
Locomotive tires, cut	34.00 to 35.00
Cut bolsters & side frames	36.00 to 37.00
Angles & splice bars	37.00 to 38.50
RR. steel car axles	41.00 to 42.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	40.00 to 42.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	31.00 to 32.00
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	34.00 to 35.00
Malleable	40.00 to 42.00
Stove plate	32.00 to 33.00

Philadelphia Area

No. 1 hvy. melting	\$22.00 to \$23.50
No. 2 hvy. melting	20.00 to 21.50
No. 1 bundles	23.00 to 24.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	12.00 to 13.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Clean cast chem. borings	22.00 to 23.00
Low phos. 5 ft and under	24.00 to 25.00
Low phos. 2 ft and under	25.00 to 26.00
Low phos. punch'gs	25.00 to 26.00
Elec. furnace bundles	23.00 to 24.00
Heavy turnings	21.00 to 22.00
RR. steel wheels	31.00 to 32.00
RR. spring steel	31.00 to 32.00
Rails 18 in. and under	41.00 to 42.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	35.00 to 36.00
Cast iron carwheels	38.00 to 39.00
Malleable	38.00 to 39.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	39.00 to 40.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut struct'l & plate, 2 ft & under	33.50 to 34.50
Drop forge flashings	28.00 to 29.00
Low phos. 2 ft & under	29.00 to 30.00
No. 1 RR. heavy melting	29.00 to 30.00
Rails 3 ft and under	44.00 to 45.00
Rails 18 in. and under	45.00 to 46.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast.	41.00 to 42.00
No. 1 machinery cast.	42.00 to 43.00
Stove plate	34.00 to 35.00
Malleable	40.00 to 41.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. plate	31.00 to 32.00

Buffalo

No. 1 hvy. melting	\$26.00 to \$27.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 busheling	26.00 to 27.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	14.50 to 15.50
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	18.00 to 18.50
Cast iron borings	17.50 to 18.50
Low phos. plate	29.00 to 30.00
Scrap rails, random lgth.	33.00 to 34.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	37.00 to 38.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	\$23.00 to \$24.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles, openhearth	25.50 to 26.50
No. 2 bundles	19.00 to 20.00
New busheling	23.00 to 24.00
Drop forge flashings	22.00 to 23.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Low phos. punch'gs, plate	24.00 to 25.00
No. 1 cupola cast.	34.00
Heavy breakable cast.	25.00
Stove plate	30.00
Automotive cast.	38.00

St. Louis

No. 1 hvy. melting	\$25.00 to \$26.00
No. 2 hvy. melting	23.50 to 24.50
No. 1 bundles	25.00 to 26.00
No. 2 bundles	19.50 to 20.50
Machine shop turn.	12.00 to 13.00
Cast iron borings	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
No. 1 RR. hvy. melting	30.50 to 31.50
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
Locomotive tires, uncut	32.00 to 33.00
Angles and splice bars	31.00 to 32.00
Std. steel car axles	40.00 to 41.00
RR. spring steel	32.50 to 33.50
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	29.00 to 30.00
Cast iron brake shoes	30.00 to 31.00
Stove plate	37.00 to 38.00
Cast iron car wheels	30.00 to 31.00
Malleable	37.00 to 38.00
Unstripped motor blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	\$16.00 to \$17.00
No. 2 hvy. melting	13.00 to 14.00
No. 2 bundles	12.00 to 13.00
Machine shop turn.	5.00 to 6.00
Mixed bor. and turn.	7.00 to 8.00
Shoveling turnings	8.00 to 9.00
Clean cast chem. borings	16.00 to 17.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	20.00
No. 2 bundles	\$15.00 to 16.00
No. 1 busheling	20.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	13.00 to 14.00
Electric furnace bundles	26.00 to 27.00
Bar crops and plate	29.00 to 30.00
Structural and plate, 2 ft	29.00 to 30.00
No. 1 RR. hvy. melting	26.00 to 27.00
Scrap rails, random lgth.	34.00 to 35.00
Rails, 18 in. and under	37.50 to 38.50
Angles & splice bars	36.00 to 37.00
Rerolling rails	39.00 to 40.00
No. 1 cupola cast.	43.50 to 44.50
Stove plate	40.50 to 41.50
Charging box cast.	19.00 to 20.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	\$16.50 to \$17.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 bundles	16.50 to 17.00
No. 2 bundles	11.00 to 12.25
No. 1 busheling	16.00 to 17.00
Elec. furnace, 3 ft & under	17.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and short turn.	6.00 to 7.00
Shoveling turnings	8.00 to 9.00
Clean cast chem. borings	11.00 to 12.00
No. 1 machinery cast.	27.00 to 29.00
Mixed cupola cast.	36.00 to 37.00
Heavy breakable cast.	23.50 to 24.00
Stove plate	24.00 to 25.00
Unstripped motor blocks	7.00 to 8.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	27.00 to 28.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.50 to 14.50
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Low phos., 18 in. & under	32.00 to 33.00
Rails, random lengths	37.00 to 38.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00
Hvy. breakable cast.	36.00 to 37.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast.	\$42.00 to 45.00

Los Angeles

No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	17.00
No. 2 bundles	\$15.50 to 16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Shoveling turnings	7.00 to 9.00
Cast iron borings	7.00 to 9.00
Elec. fur. 1 ft and under	25.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	42.00 to 44.00

Seattle

No. 1 hvy. melting	\$23.00 to \$25.00
No. 2 hvy. melting	19.00 to 21.00
No. 1 bundles	21.50
No. 2 bundles	17.00
No. 3 bundles	12.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	\$22.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bushelings	17.00
Bush., new fact prep'd	20.00
Bush., new fact unprep'd	16.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, remelting	31.00
Cast scrap	\$42.00 to 45.00

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June 17, 1954

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Comparison of Prices

(Effective June 15, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	June 15 1954	June 8 1954	May 18 1954	June 16 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.925¢
Cold-rolled sheets	4.775	4.775	4.775	4.775
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.275
Hot-rolled strip	3.925	3.925	3.925	3.925
Cold-rolled strip	5.513	5.513	5.513	5.513
Plate	4.10	4.10	4.10	4.10
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$8.95	\$8.95	\$8.95	\$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. terns	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.16¢	4.16¢	4.16¢	4.15¢
Cold finished bars	5.22	5.22	5.20	5.20
Alloy bars	4.875	4.875	4.875	4.875
Structural shapes	4.10	4.10	4.10	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	\$4.325	\$4.325	\$4.325	\$4.325
Light rails	5.20	5.20	5.20	5.20
Semifinished Steel: (per net ton)				
Re-rolling billets	\$62.00	\$62.00	\$62.00	\$62.00
Slabs, re-rolling	62.00	62.00	62.00	62.00
Forging billets	75.50	75.50	75.50	75.50
Alloy blooms, billets, slab	82.00	82.00	82.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.525¢
Skelp	3.75	3.75	3.75	3.75
Finished Steel Composite: (per pound)				
Base price	4.634¢	4.634¢	4.634¢	4.632¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	June 15 1954	June 8 1954	May 18 1954	June 16 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$61.10	\$61.10	\$61.10	\$60.00
Foundry, Valley	56.50	56.50	56.50	56.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	58.00
Foundry, Birmingham	52.88	52.88	52.88	51.30
Foundry, Chicago	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	60.27	60.27	60.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	55.00
Ferromanganese, cents per lb.	10.00¢	10.00¢	10.00¢	10.00¢
† 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	\$56.50	\$56.50	\$56.50	\$55.25
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$29.50	\$29.50	\$30.50	\$42.50
No. 1 steel, Phila. area	22.75	22.75	22.75	40.50
No. 1 steel, Chicago	32.00	32.50	31.00	38.50
No. 1 bundles, Detroit	26.00	26.00	23.50	37.50
Low phos., Youngstown	31.50	31.50	31.50	46.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	49.50
No. 1 mach'y cast, Philadel'a	39.50	39.50	39.50	47.50
No. 1 mach'y cast, Chicago	41.00	41.00	41.00	48.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$28.08	\$28.25	\$28.08	\$40.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.38	\$14.38	\$14.38	\$14.75
Foundry coke, prompt	16.75	16.75	16.75	17.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.875¢
Copper, Lake, Conn.	30.00	30.00	30.00	...
Tin, Straits, New York	\$3.625†	93.75*	93.50	92.50
Zinc, East St. Louis	11.00	11.00	10.25	11.00
Lead, St. Louis	14.05	14.05	13.80	13.30
Aluminum, virgin ingot	21.50	21.50	21.50	20.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50
† Tentative. * Average. * Revised.				

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on p. 209 →

Producing Point	Basic	Fdry.	Mall.	Ess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	...
Birmingham R3	52.38	52.88	...	...	...
Birmingham W9	52.38	52.88	...	...	...
Birmingham S3	52.38	52.88	...	...	...
Buffalo R3	56.00	56.50	57.00	...	...
Buffalo H1	56.00	56.50	57.00	...	...
Buffalo W6	56.00	56.50	57.00	...	...
Chicago J4	56.00	56.50	56.50	57.00	...
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50	57.00	...
Duquesne L3	52.50	52.50	52.50	...	...
Duluth J4	56.00	56.50	56.50	57.00	...
Erie J4	56.00	56.50	56.50	57.00	...
Everett M6	...	61.25	61.75	...	...
Fontana K1	62.00	62.50	...	...	...
Geneva, Utah C7	56.00	56.50	...	...	...
Granite City G3	57.90	58.40	58.90	...	...
Hubbard Y1	...	...	56.50	...	...
Minnequa C6	58.00	59.00	59.00	...	...
Monessen P6	56.00	...	...	...	...
Neville Ial P4	56.00	56.50	56.50	...	...
Pittsburgh U1	56.00	...	...	57.00	...
Sharpville S3	56.00	56.50	56.50	57.00	...
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swedeland A2	58.00	58.50	59.00	59.50	...
Toledo J4	56.00	56.50	56.50	57.00	...
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1	...	...	56.50	57.00	...
N. Tonawanda T1	...	56.50	57.00	...	...

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct., \$2 per ton for .05 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, H1, \$68.25; Jackson, J1, G1, \$67.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct. or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferro-silicon prices are \$1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, re-rolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	...	14.25
Slabs, billets, re-rolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25	...	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	38.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25	...	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75	50.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md., E1; Middletown, O., A7; Massillon, O., R3; Gary, Ind., U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, Ind., J4.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, O., S1; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (2½¢ per lb higher) W1 (2½¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, Ill., U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, Ill., Canton, O., T5; Ft. Wayne, Ind., J4.

Wire: Waukegan, Ill., Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind., J4; Harrison, N. J., D3; Baltimore, Md., Dunkirk, N. Y., A3; Monessen, Pa., U1; Syracuse, N. Y., C11; Bridgeville, Pa., U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, N. Y., C11.

Plates: Brackenridge, Pa., A3; Chicago, Ill., U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

PYRAMID TYPE PLATE BENDING ROLL

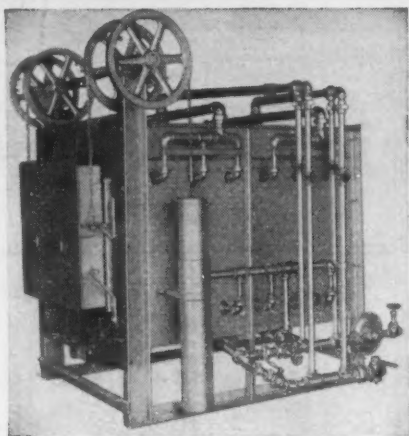
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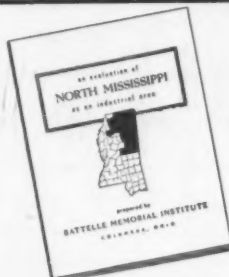
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DETAILED, UNBIASED

BATTELLE

MEMORIAL INSTITUTE OF COLUMBUS, OHIO

REPORT

ON THE ADVANTAGES OF

NORTH MISSISSIPPI

for new and expanding industries in the MACHINERY AND FABRICATED
 METAL PRODUCTS FIELDS. For a free copy of this new 40-page illus-
 trated report, write on your letterhead to:

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 West Point, Mississippi P. O. Box 337C

Harry W. Clark, Executive Director

KEYLESS DRILL CHUCKS

SLIP-PROOF

STRONGEST CHUCK MADE

TRY ONE



K. O. LEE CO.
 ABERDEEN, S. D.



If it's made by Lee it's a "Knock-Out"

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

**STEEL
PRICES**(Effective
June 15, 1954)

	BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
	Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.		\$82.00 B3		4.15 B3	6.20 B3	4.15 B3						
	Buffalo, N. Y.	\$62.00 B3	\$75.50 B3, R3	\$82.00 B3, R3	4.925 B3	4.15 B3	6.20 B3	4.15 B3	3.925 B3, R3	5.45 B3, R7	6.00 B3	8.425 B3	
	Claymont, Del.												
	Coatesville, Pa.												
	Conschohocken, Pa.							4.05 A2		5.90 A2			
	New Bedford, Mass.								6.00 R6				
	Harrison, N. J.												12.00 C1
	Johnstown, Pa.	\$62.00 B3	\$75.50 B3	\$82.00 B3		4.15 B3	6.20 B3						
	Fairless, Pa.												
	New Haven, Conn.								5.90 D1, 6.20 A5				
	Phoenixville, Pa.				3.80 P2		3.80 P2						
	Sparrows Pt., Md.							3.925 B3	5.45 B3	6.00 B3	8.425 B3		
	Wallingford, Conn.								5.90 W1				
	Worcester, Mass.								6.30 A5				12.30 A5 12.45 S7
MIDDLE WEST	Alton, Ill.							4.10 L1					
	Ashland, Ky.							3.925 A7					
	Canton-Massillon, Dover, Ohio			\$82.00 R3, T5									12.00 C4
	Chicago, Ill.	\$62.00 U1	\$75.50 R3, U1, W8	\$82.00 U1, W8, R3	4.925 U1	4.10 U1, W8	6.175 U1, Y1	4.10 U1	3.925 A1, W8	5.70 A1	5.95 R3	6.40 W8	
	Cleveland, Ohio		\$75.50 R3							5.45 A5, J3	7.80 J3 8.15 A5		12.00 A5 12.15 S7
	Detroit, Mich.			\$84.00 R5				4.075 G3 4.15 M2	5.60 D1, D2, G3, M2, P11	6.10 G3	7.90 D2 8.30 G3		
	Duluth, Minn.												
	Gary, Ind. Harbor, Indiana	\$62.00 U1	\$75.50 U1	\$82.00 U1, Y1	4.925 I3	4.10 I3, U1	6.175 U1, I3	3.925 I3, U1, Y1	5.70 I3	5.95 U1, I3 6.45 Y1		6.40 U1	
	Granite City, Ill.												
	Indianapolis, Ind.								5.60 C5				
	Mansfield, Ohio												
	Middletown, Ohio								5.45 A7				
	Niles, Warren, Ohio Sharon, Pa.							3.925 S1	5.45 S1, T4	5.95 S1	7.65 S1	6.40 S1	12.90 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$62.00 U1, J3	\$75.50 J3, U1	\$82.00 U1, C11	4.925 U1	4.10 J3, U1	6.175 J3, U1	4.10 U1	3.925 A7, P6 3.95 S7 4.425 S9	5.45 B4, J3, S7	7.80 J3	6.40 S9 6.45 S7	12.00 S9 12.15 S7
	Portsmouth, Ohio							3.925 P7					
	Weirton, Wheeling, Follansbee, W. Va.					4.10 W3		3.925 W3	5.45 F3, W3	5.95 W3	8.15 W3		
	Youngstown, Ohio			\$82.20 Y1, C10		4.10 Y1	6.675 Y1	3.925 R3, U1, Y1	5.45 R3, Y1, C5	5.95 U1, R3 6.45 Y1	7.60 R3 8.30 Y1	6.40 U1	12.00 C5
WEST	Fontana, Cal.	\$70.00 K1	\$83.50 K1	\$101.00 K1		4.75 K1	6.825 K1	5.10 K1	4.70 K1	7.35 K1	7.05 K1	7.90 K1	13.65 K1
	Geneva, Utah		\$75.50 C7			4.10 C7	6.175 C7						
	Kansas City, Mo.					4.70 S2	6.775 S2		4.525 S2		6.55 S2	7.00 S2	
	Los Angeles, Torrance, Cal.		\$85.00 B2	\$102.00 B2		4.80 B2, C7	6.85 B2		4.675 B2, C7	7.50 C1		7.60 B2	
	Minnequa, Colo.					4.55 C6			5.025 C6				
	San Francisco, Niles, Pittsburg, Cal.		\$85.00 B2			4.75 B2 4.91 P9	6.80 B2		4.675 B2, C7				
	Seattle, Wash.		\$89.00 B2			4.85 B2	6.90 B2						
SOUTH	Atlanta, Ga.								4.125 A8				
	Fairfield, Ala. City, Birmingham, Ala.	\$62.00 T2	\$75.50 T2			4.10 R3, T2	6.175 T2		3.925 R3, T2, C16		5.95 T2		
	Houston, Tex.		\$83.50 S2	\$90.00 S2		4.50 S2			4.325 S2			6.80 S2	

STEEL
PRICES(Effective
June 15, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

SHEETS

WIRE
ROD

TINPLATE†

BLACK
PLATE

	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized 10 ga.	Enamel- ing 12 ga.	Long Tern 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Calv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
Bethlehem, Pa.													
Buffalo, N. Y.	3.925 B3	4.775 B3				5.90 B3	7.225 B3			4.525 W6			
Claymont, Del.													
Coatesville, Pa.													
Consabohocken, Pa.	3.975 A2					5.90 A2							
Harrisburg, Pa.													
Hartford, Conn.													
Johnstown, Pa.										4.525 B3			
Fairless, Pa.	3.975 U1	4.825 U1				5.95 U1	7.275 U1				\$8.80 U1	\$7.50 U1	
New Haven, Conn.													
Phoenixville, Pa.													
Sparrows Pt., Md.	3.925 B3	4.775 B3	5.275 B3			5.90 B3	7.225 B3	8.075 B3		4.625 B3	\$8.80 B3	\$7.50 B3	
Worcester, Mass.										4.825 A5			
Trenton, N. J.													
Alton, Ill.										4.70 L1			
Ashland, Ky.	3.925 A7		5.275 A7	5.175 A7									
Canton-Massillon, Dover, Ohio			5.275 R1, R3						5.05 R1				
Chicago, Juliet, Ill.	3.925 A1, W8					5.90 U1				4.525 A5, N4, R3			
Sterling, Ill.										4.625 N4			
Cleveland, Ohio	3.925 J3, R3	4.775 J3, R3		5.175 R3		5.90 J3, R3	7.225 J3, R3			4.525 A5			
Detroit, Mich.	4.075 G3, M2	4.925 G3				6.05 G3	7.375 G3						
Newport, Ky.	3.925 N5												
Gary, Ind. Harbor, Indiana	3.925 I3, U1, Y1	4.775 I3, U1, Y1	5.275 U1, I3	5.175 I3, U1	5.675 U1	5.90 U1, I3 6.40 Y1	7.225 U1 7.725 Y1				\$8.70 I3, U1, Y1	\$7.40 I3, U1	6.10 U1, Y1
Granite City, Ill.	4.125 G2	4.975 G2	5.475 G2	5.375 G2								\$7.80 G2	6.30 G2
Kokomo, Ind.	4.025 C9		5.375 C9						5.025 C9	4.625 C9			
Manafield, Ohio					5.675 E2				5.05 E2				
Middletown, Ohio		4.775 A7		5.175 A7	5.675 A7								
Niles, Ohio Sharon, Pa.	3.925 S1 5.175 N3	5.80 N3	5.275 N3	6.525 N3	5.45 S1 5.675 N3	5.90 S1						\$7.40 R3	
Pittsburgh, Pa. Midland, Pa. Butler, Pa.	3.925 J3, U1, P6, A7	4.775 J3, U1, P6	5.275 U1	5.175 U1		5.90 J3, U1	7.225 J3, U1	7.925 U1		4.525 A5 4.725 P6	\$8.70 J3, U1	\$7.40 J3, U1	6.10 U1
Portsmouth, Ohio	3.925 P7	4.775 P7								4.525 P7			
Weirton, Wheeling, Follansbee, W. Va.	3.925 W3, W5	4.775 W3, W5, F3	5.275 W3, W5		5.675 W3, W5	5.90 W3	7.225 W3				\$8.70 W3, W5	\$7.40 W3, W5	6.10 F3, W5
Youngstown, Ohio	3.925 R3, U1, Y1	4.775 R3, Y1		5.175 Y1		5.90 U1, R3 6.40 Y1	7.225 R3 7.725 Y1			4.525 Y1	\$8.70 R3		
Fontana, Cal.	4.70 K1	5.875 K1				6.675 K1	8.275 K1			5.325 K1			
Geneva, Utah	4.025 C7												
Kansas City, Mo.									4.775 C6	4.865 S2			
Los Angeles, Torrance, Cal.	4.625 C7		6.275 C7							5.325 B2			
Minnequa, Colo.										4.775 C6			
San Francisco, Niles, Pittsburg, Cal.	4.625 C7	5.725 C7	6.025 C7							5.175 C7	\$9.45 C7	\$8.15 C7	
Seattle, Wash.													
Atlanta, Ga.													
Fairfield, Ala. Alabama City, Ala.	3.925 R3, T2	4.775 T2	5.275 R3, T2			5.90 T2			5.125 T2 5.225 R3	4.525 T2 R3	\$8.80 T2	\$7.50 T2	
Houston, Texas	4.325 S2									4.925 S2			

† Special coated mfg.
terne deduct 95¢ from
1.25-lb coke base box
price. Can-making quality
blackplate \$5 to 128 lb
deduct \$2.20 from 1.25-lb
coke base box.
* COKES: 1.50 lb
add 25¢.
ELECTRO: 0.50-lb add
25¢; 0.75-lb add 65¢;
1.00-lb add \$1.20.

IRON AGE		<i>Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.</i>										
STEEL PRICES		BARS						PLATES				WIRE
<i>(Effective June 15, 1954)</i>		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Milgr's Bright
EAST	Bethlehem, Pa.				4.875 B3	6.325 B3	6.225 B3					
	Buffalo, N. Y.	4.15 B3 4.18 R3	4.15 B3,R3	5.25 B5	4.875 B3,R3	6.325 B3,B5	6.225 B3	4.10 B3			6.25 B3	5.525 W6
	Claymont, Del.							4.10 C4		5.55 C4		
	Coatesville, Pa.							4.10 L4		5.55 L4		
	Conschohecken, Pa.							4.10 A2	5.15 A2		6.25 A2	
	Harrisburg, Pa.							3.85 C3	5.15 C3			
	Hartford, Conn.			5.70 R3		6.775 R3						
	Johnstown, Pa.	4.15 B3	4.15 B3		4.875 B3		6.225 B3	4.10 B3		5.55 B3	6.25 B3	5.525 B3
	Fairless, Pa.	4.30 U1	4.30 U1		5.025 U1							
	Newark, N. J.			5.65 W10		6.65 W10						
	New Haven, Conn.											
	Camden, N. J.			5.65 P10		6.50 P10						
	Putnam, Conn.			5.75 W10								
	Sparrows Pt., Md.		4.15 B3					4.10 B3		5.55 B3	6.25 B3	5.525 B3
	Palmer, Worcester, Mansfield Mass.			5.75 B5 6.10 W11		6.775 B5						5.525 A5, W6
	Readville, Mass.			5.75 C14								
MIDDLE WEST	Alton, Ill.	4.35 L1										5.70 L1
	Ashland, Ky.							4.10 A7				
	Canton-Massillon, Ohio			5.20 R2 5.24 R3	4.875 R3,T5	6.325 R2,R3,T5						
	Chicago, Joliet, Ill.	4.15 U1, N4,W8 4.22 R3	4.15 R3,N4	5.20 A5,W10, W8,B5,L2	4.875 U1, W8,R3	6.325 A5,W8, W10,L2, R3,B5		4.10 U1,W8	5.15 U1	5.55 U1	6.25 U1	5.525 A1, R3,N4,W7
	Cleveland, Ohio	4.21 R3	4.15 R3	5.20 A5,C13		6.325 A5, C13		4.10 J3,R3	5.15 J3		6.25 J3	5.525 A5, R3,C13
	Detroit, Mich.	4.30 R5,G3		5.35 R5,P8 5.40 B5 5.45 P3	4.975 R5 5.025 G3	6.425 R5 6.475 P8 6.525 B5,P3	6.375 G3	4.25 G3			6.40 G3	
	Duluth, Minn.											5.525 A5
	Gary, Ind. Harbor, Crawfordsville	4.15 I3, U1, Y1	4.15 I3, U1, Y1	5.27 R3	4.875 I3, U1, Y1	6.325 R3,M5	6.225 U1,I3 6.725 Y1	4.10 I3, U1, Y1	5.15 I3	5.55 U1	6.25 U1,I3 6.75 Y1	5.625 M4
	Granite City, Ill.							4.30 G2				
	Kokomo, Ind.											5.625 C9
	Sterling, Ill.	4.25 N4	4.25 N4									5.625 N4
	Niles, Ohio Sharon, Pa.							4.10 S1		5.55 S1	6.25 S1	
	Pittsburgh, Pa. Midland, Pa.	4.15 J3, U1	4.15 J3, U1	5.20 A5,C8, J3,W10 5.26 R3	4.875 U1,C11	6.325 A5,C11, W10,C8	6.225 J3, U1	4.10 J3, U1	5.15 U1	5.55 U1	6.25 J3, U1	5.525 A5, J3,P6
	Portsmouth, Ohio											5.525 P1
	Weirton, Wheeling, Follansbee, W. Va.	4.15 W3						4.10 W3				
	Youngstown, Ohio	4.15 U1, Y1 4.20 R3	4.15 R3, U1, Y1	5.20 Y1,F2	4.875 U1, Y1, C10	6.325 Y1, C10,F2	6.225 U1 6.725 Y1	4.10 R3, U1, Y1			6.75 Y1	5.525 Y1
WEST	Emeryville, Cal.	4.90 J5	4.90 J5									
	Fontana, Cal.	4.85 K1	4.85 K1		5.925 K1		7.475 K1	4.75 K1		6.60 K1	6.95 K1	
	Geneva, Utah							4.10 C7			6.25 C7	
	Kansas City, Mo.	4.75 S2	4.75 S2		5.475 S2		6.825 S2					6.125 S2
	Los Angeles, Torrance, Cal.	4.85 B2,C7	4.85 B2,C7	6.65 R3 6.96 R3	5.925 B2		6.925 B2					6.475 B2
	Minneapolis, Colo.	4.60 C6	4.75 C6					4.95 C6				5.775 C6
	Portland, Ore.	4.90 O2										
	San Francisco, Niles, Pittsburg, Cal.	4.85 C7,P9 4.90 B2	4.85 C7,P9 4.90 B2				6.975 B2					6.475 C7
	Seattle, Wash.	4.90 B2,N6	4.90 B2				6.975 B2	5.90 B2			7.15 B2	
	Atlanta, Ga.	4.35 A8	4.35 A8									5.725 A8
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	4.15 T2,C16 4.18 R3	4.15 R3,T2, C16				6.225 T2	4.10 R3,T2			6.25 T2	5.525 R3, T2
	Houston, Ft. Worth, Lone Star, Tex.	4.55 S2	4.55 S2		5.275 S2			4.50 L3,S2				5.925 S2

Steel Prices

(Effective June 15, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Ward Steel Co., Conahohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I1 Ingersoll Steel Div., Chicago
I2 Inland Steel Co., Chicago
I3 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit

P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Fred Ulbrich & Sons, Wallingford, Conn.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (per) l.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS											
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.			
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.		
STANDARD T. & C.																								
Sparrows Pt. B3	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0										
Youngstown R3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0										
Fontana K1	13.25	+2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0										
Pittsburgh J3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Alton, Ill. L1	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0										
Sharon M3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0										
Fairless N2	24.25		27.25		29.75		32.25		32.75		33.25		34.75											
Pittsburgh N1	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Wheeling W5	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0										
Wheatland W4	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Youngstown Y1	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Indiana Harbor Y1	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Lorain N2	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
EXTRA STRONG PLAIN ENDS																								
Sparrows Pt. B3	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0										
Youngstown R3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Fontana K1	16.75		20.75		22.75		23.25		23.75		24.25		24.75											
Pittsburgh J3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		
Alton, Ill. L1	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0										
Sharon M3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Pittsburgh N1	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		
Wheeling W5	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Wheatland W4	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Youngstown Y1	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		
Indiana Harbor Y1	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0										
Lorain N2	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		

Galvanized discounts based on zinc, at 11¢ per lb. East St. Louis. For each 1¢ change in zinc, discounts may vary as follows: 1/2 in., 3/4 in., and 1 in., 1 pt.; 1 1/4 in., 1 1/2 in., 2 in., 3/4 pt.; 2 1/2 in., 3 in., 1/2 pt. Calculate discounts on even cents per lb. of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb. use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only butt weld and seamless, 2 1/4 pts. higher discount. Plain ends, butt weld and seamless, 3 in. and under, 4 1/2 pts. higher discount. Butt weld jobbers' discount, 5 pct. East St. Louis zinc price now 11.00¢.

Steel Prices

(Effective June 15, 1954)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer U1	4.325	5.20	5.275				
So. Chicago R3				7.05			
Cleveland R3							
Ensley T2	4.325	5.20					
Fairfield T2		5.20		7.05		5.125	
Gary U1	4.325	5.20				5.125	
Ind. Harbor J3	4.325		5.275	7.05		5.125	
Johnstown B3		5.20					
Joliet U1		5.20	5.275				
Kansas City S2				7.05			11.00
Lackawanna B3	4.325	5.20	5.275			5.125	
Lebanon B3				7.05	10.50		11.00
Minnequa C6	4.325	5.70	5.275	7.05		5.125	11.00
Pittsburgh O1					10.50		11.00
Pittsburgh P5					10.50		11.00
Pittsburgh J3				7.05			
Pittg. Cal. C7						5.275	
Seattle B3				7.55		5.275	11.50
Steelton B3	4.325		5.275			5.125	
Struthers Y1						5.275	
Terrance C7						5.275	
Youngstown R3				7.05			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi- Processed	Fully Processed
Field		8.05	
Armature	8.15	8.40	8.90
Elect.	8.75	9.00	9.50
Motor	9.75	10.00	10.50
Dynamo	10.65	10.90	11.40
Trans. 72	11.60	11.85	12.35
Trans. 65	12.15	Grain Oriented	
Trans. 58	12.65	Trans. 80	16.25
Trans. 52	13.65	Trans. 73	16.75

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (J3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville (A7).

* Coils 75¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., L4	*32.7	
Washington, Pa., J2		
Claymont, Del., C4		
New Castle, Ind., I2		32.50
Nickel-carbon		
10 pct. Coatesville, Pa., L4		37.5
Inconel-carbon		
10 pct., Coatesville, Pa., L4		46.10
Mono-carbon		
10 pct. Coatesville, Pa., L4		38.90

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Col	Col	Col	Col	Col	Col	Col
	Standard & Coated Nails	Woven Wire Fence 9-15 1/2 ga.	40-42 Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbed Wire	Merch. Wire Anod.	Merch. Wire * Galv.
Alabama City R3	131	140	140	153	6.675	7.475	
Aliquippa, Pa. J3	131	143		150	6.675	7.20	
Atlanta A8	133	145	151	158	6.775	7.20	
Bartonsville K2	133	145	151	158	6.775	7.20	
Buffalo W6							
Chicago, Ill. N4	131	143	140	150	6.675	7.20	
Cleveland A6	137						
Cleveland A5					6.675		
Crawfordsville M4	133	145	151	153	6.775	7.325	
Donora, Pa. A5	131	140	149	153	6.675	7.475	
Duluth A5	131	140	145	149	153	6.675	7.475
Fairfield, Ala. T2	131	140	149	153	6.675	7.475	
Galveston D4	139	148					
Houston S2	139	148		161	7.075	7.475	
Johnstown, Pa. B3	131	143	145	156	6.675	7.225	
Joliet, Ill. A5	131	140	149	153	6.675	7.475	
Kokomo, Ind. C9	133	142	151	155	6.675	7.175	
Los Angeles R2					6.425		
Kansas City S2	143	152	161	165	7.275	7.675	
Minnequa C6	134	148	150	162	6.925	7.325	
Monessen P6	131	145		157	6.675	7.225	
Moline, Ill. R5			145				
Pittsburg, Cal. C7	150	163	173	173	7.425	8.025	
Portsmouth P7					6.475		
Rankin, Pa. A5	131	140		153	6.675	7.475	
So. Chicago R3	131	140	145	149	153	6.675	7.475
S. San Francisco C6				173			
Sparrows Pt. B3	133		151	158	6.775	7.325	
Struthers, O. Y1	137				6.675	7.175	
Worcester A5	137				6.975		
Williamsport, Pa. S10	133	150					

Cut Nails, carloads, base \$3.00 per keg (less 2¢ in jobbers), at Conshohocken, Pa. (A2).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.8¢ per lb.

WARE-HOUSES

Base price, f.o.b., dollars per 100 lb. *

Cities	City Delivery Charge	Sheets		Strip		Plates Shapes		Bars		Alloy Bars			
		Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled	Standard Structural	Hot-Rolled	Cold- Finished	Hot-Rolled A-4615 As rolled	Hot-Rolled A-4140 As rolled	Cold-Drawn A-4615 As rolled	Cold-Drawn A-4140 As rolled
Baltimore	\$.20	6.20	7.12	7.36	7.00		6.85	6.98	6.86	6.17			
Birmingham	.15	6.10	7.00	8.00*	6.30		6.35	6.35	6.15	6.90			
Boston	.20	6.09	7.83	9.18	7.13	9.35*	7.13	7.06	6.87	6.35	12.40	11.94	14.55
Buffalo	.20	6.18	7.15	8.70	6.65		6.65	6.55	6.35	7.70		12.28	14.58
Chicago	.20	6.20	7.12	7.95	6.79		6.68	6.59	6.35	7.70		12.15	14.55
Cincinnati	.20	6.18	7.12	7.95	6.42		6.33	6.46	6.28	7.30		11.60	14.05
Cleveland	.20	6.30	7.11		6.66		6.62	6.93	6.52	7.60		11.85	14.30
Cleveland	.20	6.18	7.12	8.25	6.58		6.50	6.79	6.34	7.40	12.04	11.74	14.29
Denver		7.95	8.85	10.45	8.20	9.55	7.95	7.95	8.05	9.05			15.75
Detroit	.20	6.35	7.29	8.42	6.69	7.36	6.80	6.91	6.56	7.60	12.47	11.92	14.42
Houston	.20	6.45	7.31	7.71			6.93						14.62
Kansas City	.20	7.15	7.45	9.23	7.45		7.20	7.35	7.45	9.30		12.80	
Los Angeles	.20	6.85			7.09		7.00	7.13	6.95	8.07			
Memphis	.10	6.79	7.69		6.90		7.01	7.09	6.88	7.89			
Milwaukee	.20	6.35	7.29	8.17	6.59		6.50	6.63	6.45	7.57		11.77	14.22
New Orleans	.15	6.51	7.41		6.63		6.73	6.81	6.60	8.37			
New York	.30	6.78	7.75	8.37	7.16	9.15*	6.99	6.90	7.06	8.43	12.29	11.99	14.54
Norfolk	.20	6.90		8.417			7.00	7.00	7.00	8.50			
Philadelphia	.25	6.35	7.13	7.87	7.02		6.63	6.67	6.87	8.19		11.74	14.19
Pittsburgh	.20	6.18	7.12	8.00	6.55		6.33	6.46	6.28	7.65		11.60	14.05
Portland	.10	7.60	8.45	9.05	7.65		7.30	7.25	7.35	10.65			
Salt Lake City	.20	8.60	10.50	10.50*	9.25		8.10	8.25	9.20	11.25			
San Francisco	.20	7.35	8.70	9.80	7.60		7.20	7.25	7.15	9.75		12.90	15.90
Seattle	.20	7.95	9.30	9.80	7.80		7.40	7.30	7.40	10.45		13.15	15.60
St. Louis	.20	8.15	9.50		8.00		7.60	7.50	7.60	10.65			
St. Paul	.15	6.48	7.42	8.25	6.72	7.70	6.73	6.86	6.58	7.70	12.20	11.90	14.45
			8.30	8.53									14.35
			8.33	8.61	7.08	13.22	6.99	7.12	6.94	8.06		12.42	

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (*) 500 to 1499 lb. (1) 20,000 lb or over. (2) 450 to 1499 lb. (3) 500 to 999 lb. (4) 1000 lb or over. (5) 400 to 1499 lb. (6) 1500 to 3499 lb. (7) 2000 to 5999 lb.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06- 1.35
Bridgeport, Conn. S7*	5.75	7.65	8.60	10.55	12.45
Carnegie, Pa. S9		7.65	8.60	10.55	12.45
Cleveland A5	5.45	7.65	8.60	10.55	12.45
Detroit D1	5.65	7.85	8.80	10.55	
Detroit D2	5.60	7.85	8.80	10.55	
Harrison, N. J. C11			8.90	10.85	12.15
Indianapolis C5	5.60	7.90		10.55	
New Castle, Pa. B4	5.80	8.00	8.60		
New Haven, Conn. D1	5.90	7.95	8.90	10.85	
Riverdale, Ill. A1	5.70	7.90	8.75	10.70	13.00
Buffalo, N. Y. R7	5.45	7.65	8.60	10.55	12.45
Sharon, Pa. S1	5.45	7.65	8.60	10.55	12.45
Trenton R4		7.95	8.90	10.85	13.15
Wallingford W1	6.20	7.95	8.90	10.85	13.15
Warren, Ohio T4	5.45	7.65	8.60	10.55	12.45
Weirton, W. Va. W3	5.45	7.65	8.60	10.55	12.45
Worcester, Mass. A5	5.90	7.95	8.90	10.85	13.15
Youngstown C5	5.45	7.65	8.60	10.55	

* Sold on Pittsburgh base.

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	27.34	32.90	26.51	31.99
	2 1/2	12	36.82	44.41	35.70	43.67
	3	12	42.52	51.20	41.23	49.73
	3 1/2	11	49.63	59.87	48.13	58.06
	4	10	65.91	79.50	63.92	77.18
National Tube	2	13		32.90	26.51	
	2 1/2	12	36.82	44.41	35.70	
	3	12	42.52	51.20	41.23	
	3 1/2	11	49.63	59.87	48.13	
	4	10	65.91	79.50	63.92	
Pittsburgh Steel	2	13	27.34	32.90		
	2 1/2	12	36.82	44.41		
	3	12	42.52	51.20		
	3 1/2	11	49.63	59.87		
	4	10	65.91	79.50		

Miscellaneous Prices

(Effective June 15, 1954)

TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.48
18	4	1	—	5	2.16
18	4	2	—	—	1.64
18	4	1.5	8	—	.895
1.5	4	2	6	—	1.005
6	4	2	6	—	.70
High-carbon chromium					.39
Oil hardened manganese					.355
Special carbon					.30
Extra carbon					.25
Regular carbon					Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

Per Net Ton

6 to 24-in., del'd Chicago	\$111.80 to \$115.30
6 to 24-in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$129.50 to \$131.50
Class "A" and gas pipe, 5¢ extra; 4-in. pipe is \$5 a ton above 6-in.	

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

Gross Ton

Openhearth lump	\$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90
Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.	

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.25 to \$14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.50 to \$17.00
Foundry, oven coke	
Buffalo, del'd	\$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erle, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed

GRAPHITE			CARBON		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	29.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
8	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2 1/2	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pot Off List		Less		Less	
Keg	Reg.	Keg	Hvy.	Keg	K.
1/2 in. & smaller	+2	15	+2	18	
9/16 in. & 5/8 in.	+7	11	+32*	+10*	
3/4 in. to 1 1/2 in.					
inclusive	+8	10	+27**	+6**	
1 1/2 in. & larger	+9	9	+27	+6	
* 9/16 to 5/8 in.					
** 5/8 to 1 1/2 in.					

Nuts, Hot Pressed—Hexagon

1/2 in. & smaller	11	26	8	23
9/16 in. & 5/8 in.	2	18	+20	net
3/4 in. to 1 1/2 in.				
inclusive	+6	12	+25	+4
1 1/2 in. & larger	+8	10	+25	+4

Nuts, Cold Punched—Hexagon

1/2 in. & smaller	11	26	8	23
9/16 in. & 5/8 in.	9	24	+2	15
3/4 in. to 1 1/2 in.				
inclusive	+1	16	+9	9
1 1/2 in. & larger	+16	3	+20	net

Nuts, Semi-Finished—Hexagon

1/2 in. & smaller	23	36	14	28
9/16 in. & 5/8 in.	18	32	4	20
3/4 in. to 1 1/2 in.				
inclusive	8	23	+8	10
1 1/2 in. & larger	+14	5	+20	net
Light				
7/16 in. & smaller	33	43		
1/2 in. thru 5/8 in.	26	37		
3/4 in. to 1 1/2 in.				
inclusive	18	30		

Stove Bolts

Pot Off List

Packaged, steel, plain finished	44 1/2—10
Packaged, plain finish	25 1/2—10
Bulk, plain finish**	59*
* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.	
** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.	

Rivets

Base per 100 lb

1/2 in. & larger	\$8.90
Pct Off List	
7/16 in. and smaller	30

Cap and Set Screws

(In bulk)

Pct Off List

Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 5/8 in. x 6 in., SAE 1020, bright	40
3/4 in. thru 1 in. up to & including 6 in.	26
1/4 in. thru 5/8 in. x 6 in. & shorter	
high C double heat treat	43
3/4 in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

Pct Off List

Less		C.	
1/2 in. & smaller x 6 in. & shorter	4	20	
9/16 in. & 5/8 in. x 6 in. & shorter	5	21	
3/4 in. & larger x 6 in. & shorter	3	19	
All diam. longer than 6 in.	+4	13	
Lag, all diam. x 6 in. & shorter	12	27	
Lag, all diam. longer than 6 in.	8	23	
Plow bolts	30		

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$109.00
No. 1 Ohio	102.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	102.00
No. 2 Ohio	93.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	16.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$115.00
Childs, Hays, Pa.	120.00
Chicago District	125.00
Western Utah	131.00
California	138.00
Super Duty	
Hays, Pa., Athens, Tex., Windham	133.00
Curtner, Calif.	150.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	19.00
Silica cement, net ton, bulk, Hays, Pa.	21.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	20.00
Silica cement, net ton, bulk, Utah and Calif.	28.50

Chrome Brick

Per net ton

Standard chemically bonded Balt.	\$86.00
Standard chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	\$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

St. %-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	\$64.40
Domestic, f.o.b. Chewelah, Wash., Luning, Nev.	
in bulk	38.00
in sacks	43.75

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	\$14.50
Midwest	14.60
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill. Price, net ton; Effective CaF ₂ content	
72 1/2 %	\$44.00
70 % or more	42.50
60 % or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. Iberville, P.Q.	10.5¢
Domestic sponge iron, 98+ % Fe, carload lots	18.0¢
Electrolytic iron, annealed, 99.5+ % Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	60.0¢
Hydrogen reduced iron minus 300 mesh, 98+ % Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+ % Fe	83.0¢ to \$1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	\$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	82.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	\$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	\$4.65
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective June 15, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered.
65-72 Cr, 2% max. Si
0.025% C ... 34.50 0.20% C ... 33.50
0.06% C ... 34.50 0.50% C ... 33.25
0.10% C ... 34.00 1.00% C ... 33.00
0.15% C ... 33.75 2.00% C ... 32.75
65-69% Cr, 4.9% C ... 24.75
62-66% Cr, 4.6% C, 6-9% Si ... 25.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.
High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C
Carloads ... 25.85
Ton lots ... 28.00
Less ton lots ... 29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.
0.10% max. C ... \$1.18
0.50% max. C ... 1.14
9 to 11% C ... 1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.)
Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.
30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads ... 19.00
Ton lots ... 22.10
Less ton lots ... 23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads ... 20.00
Ton lots ... 22.30
Less ton lots ... 23.80

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots ... 17.50
Less ton lots ... 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots ... 16.60
Ton lots ... 18.10
Less ton lots ... 19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed ... 17.50
Ton lots to carload packed ... 18.50
Less ton lots ... 20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn:
Producing Point
Marietta, Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala.; Portland, Ore. ... 10.00
Clairton, Pa. ... 10.00
Sheridan, Pa. ... 10.00
Philo, Ohio ... 10.00
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk ... 12.50
Ton lots, packed ... 14.05

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
Manganese Silicon
16 to 19% 3% max. ... \$84.00
19 to 21% 3% max. ... 86.00
21 to 23% 3% max. ... 88.50
23 to 25% 3% max. ... 91.00

Manganese Metal

Contract basis 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed ... 36.95
Ton lots ... 38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads ... 30.00
Ton lots ... 32.00
250 to 1999 lb ... 34.00
Less than 250 lb ... 37.00
Premium for hydrogen-removed metal ... 1.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 87-90%.
Carloads Ton Less
0.07% max. C, 0.06% P, 90% Mn ... 30.00 31.85 33.05
0.07% max. C ... 27.95 29.80 31.00
0.15% max. C ... 27.45 29.30 30.50
0.30% max. C ... 26.95 28.80 30.00
0.50% max. C ... 26.45 28.30 29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ... 23.45 25.30 26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mo, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.
Carload bulk ... 11.00
Ton lots ... 12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet ... 12.65
Ton lots, packed ... 14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$92.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$89.50. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.
Ton Lots Carloads
96% Si, 2% Fe ... 20.10 18.00
97% Si, 1% Fe ... 20.60 18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 2 lb Si briquets.
Carloads, bulk ... 6.30
Ton lots ... 7.90

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.
25% Si ... 20.00 75% Si ... 13.80
50% Si ... 10.80 85% Si ... 15.55
65% Si ... 12.20 90.95% Si ... 17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.
Cast Turnings Distilled
Ton lots ... \$2.05 \$2.95 \$3.75
Less ton lotst. ... 2.40 3.30 4.55

Ferrovandium

35-55% contract, basis, delivered, per pound, contained V.
Openhearth ... \$3.00-\$3.10
Crucible ... 3.10-3.20
High speed steel (Primos) ... 3.20-3.25

Alisifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ... 9.36¢
Ton lots ... 10.15¢

Calcium molybdate, 46.3-46.6%, f.o.b. Langeloth, Pa., per pound contained Mo ... \$1.16

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.
Ton lots ... \$9.50
Less ton lots ... 9.55

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta ... \$4.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo ... \$1.21

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton ... \$96.00
10 tons to less carload ... \$110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... \$1.91

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... \$1.50
Less ton lots ... 1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... \$177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. ... \$2.80

Molybde oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. ... \$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... \$1.12

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound.
Carload, bulk, lump ... 15.50¢
Ton lots, racked lump ... 16.75¢
Less ton lots, lump, packed. ... 17.35¢

Vanadium Pentoxide, 86 - 89% V₂O₅ contract basis, per pound contained V₂O₅ ... \$1.21

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ... 8.00¢

Boron Agents
Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4% Si, 40-45%, per lb contained B ... \$5.35

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ... 45¢
Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ... 10.00¢

Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots ... \$1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B95
14 to 19% B ... 1.20
19% min. B ... 1.50

Grinal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over
No. 1 ... \$1.00
No. 6 ... 43¢
No. 79 ... 50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots ... \$1.45
Less ton lots ... 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
Less ton lots ... \$2.65

Silenz, contract basis, delivered
Ton lots ... 45.00¢